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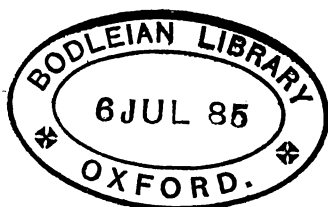
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Yorkshire Philosophical Society.

ANNUAL REPORT

FOR

MDCCCLXXVII.



ANNUAL REPORT
OF THE COUNCIL
OF THE
YORKSHIRE
PHILOSOPHICAL SOCIETY

FOR

MDCCCLXXVII.

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 5TH, 1878.

YORK:

J. SOTHERAN, BOOKSELLER, CONEY STREET.

1878.

PATRONESSES

OF THE

Yorkshire Philosophical Society.

HER MAJESTY THE QUEEN.

H. R. H. THE PRINCESS OF WALES.

PATRONS.

H. R. H. THE PRINCE OF WALES.

H. R. H. THE DUKE OF CONNAUGHT.

THE ARCHBISHOP OF YORK.

OFFICERS OF THE SOCIETY, 1878.

PRESIDENT:

HIS GRACE THE ARCHBISHOP OF YORK, F.R.S.

VICE-PRESIDENTS:

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THE HON. AND VERY REV. THE DEAN OF YORK, D.D.
WILLIAM HENRY RUDSTON READ, M.A., F.L.S.
EGERTON VERNON HARCOURT, M.A., F.G.S.
THE VEN. ARCHDEACON HEY, M.A.
THE REV. CANON RAINE, M.A.
WILLIAM REED, F.G.S.
JOHN FRANCIS WALKER, M.A., F.L.S., F.G.S., F.C.S.,
MEMBER OF THE COMMITTEE OF THE BRITISH ASSOCIATION, &c.
WILLIAM WALKER, F.G.S.
J. H. GIBSON, M.D.

TREASURER:

WILLIAM GRAY, F.R.A.S., F.G.S.

COUNCIL:

Elected 1876. WILLIAM MATTERSON, M.D.
THE REV. GEORGE ROWE, M.A.
TEMPEST ANDERSON, M.D., B.SC.,
FELLOW OF UNIVERSITY COLLEGE, LONDON.
JOSEPH WILKINSON, F.R.G.S.
Elected 1877. JOHN P. WOOD.
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WILLIAM LEWIN NEWMAN.
WILLIAM BARNBY (for 2 years.)

HON. SECRETARY:

T. S. NOBLE, F.R.A.S., F.G.S.

CURATORS :

GEOLOGY	W. REED, F. G. S.
MINERALOGY	W. H. HUDLESTON, M. A., F. G. S.
COMPARATIVE ANATOMY . .	T. ANDERSON, M. D.
BRITISH ORNITHOLOGY . .	W. H. RUDSTON READ, M. A. F. L. S.
INSECTS AND CRUSTACEA . .	VEN. ARCHDEACON HEY, M. A.
ETHNOGRAPHICAL COLLECTION	J. H. GIBSON, M. D.
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LIBRARY	REV. G. ROWE, M. A.
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CONCHOLOGY	S. W. NORTH, F. G. S.
OBSERVATORY & METEOROLOGY	{ W. GRAY, F. R. A. S., F. G. S.
<i>under the care of a Committee</i>	{ VEN. ARCHDEACON HEY, M. A.
<i>consisting of</i>	{ T. S. NOBLE, F. R. A. S., F. G. S.

REPORT OF THE COUNCIL

OF THE

YORKSHIRE PHILOSOPHICAL SOCIETY,

FEBRUARY 5TH, 1878.

The gross income of the Society for the year 1877 has been £1388 16s. 10d., whilst the total expenditure has amounted to £1587 7s. 5d., leaving a balance due to the Treasurer on the year's account of £198 10s. 7d.

Although the income of the Society is apparently below an average, yet this is not so in fact. The possession of the land, part of the Manor Shore Estate, late the leasehold property of the Society, and from which about £100 a year was received in rents, has been surrendered to the Fine Art Committee, and, consequently, there is a loss of income to that extent which is more than counterbalanced by the Crown rent of £120 formerly paid for the same land, and which has now ceased to be paid.

The Council, however, consider it to be a matter for congratulation when the extra-ordinary outgoings for the year, on works absolutely required to maintain the fabric of the Museum, are taken into account, that the balance due to the Treasurer is so small in amount.

The damp and unsatisfactory state of the upper rooms in the Museum, in which the Ethnological collection was exhibited, had for some time previous to the past year received the consideration of the Council, and various attempts to remove the cause of damage had been made, but without success. The injury to the walls and ceiling at length became so serious, that the Council resolved to take the opinion of their Architect, Mr. Atkinson, on the matter. Mr. Atkinson reported

that the interior rafters and stone-work of the roof were in so damaged a condition as to require immediate repair. He advised that a new roof be built, and at a higher pitch, and that the two rooms containing the Ethnological collection be made continuous, whereby considerable space would be gained. The Council adopted the report, and the required work has been done, at a cost of £335 14s. 8d., a sum which includes not only the cost of the repairs, but all expenses incident to the repair and enlargement of the cases of the Ethnological collection, and in fitting them to the walls. By this alteration the Society have gained to their Museum a room 62 feet by 18½ feet wide, in which the collection can now be exhibited to the utmost advantage, without any break in its continuity, a point of great importance in a collection intended to trace the works of man from the Palæolithic age to a time comparatively recent.

The Council now propose to add to the general account the Lodge account, hitherto kept separate. The balance which still exists on this account amounts to £650 2s. 3d., but as the last year's account disclosed a balance in hand of £430 2s. 4d., the actual debt on the present year's account as shewn in the Treasurer's balance sheet, after deducting the deficit of £198 10s. 7d. on the present year's account, will be £418 10s. 6d. When the Members are reminded that this debt is the result of the alterations referred to, and of the extra-ordinary outlay which the Society incurred a few years ago in providing the present Lodge, which is so great an ornament to our grounds and to the quarter of the City in which it stands, they will concur with the Council, whilst regretting the existence of any debt on the annual balance sheet, that such debt was unavoidable under the circumstances.

There are also other items of expenditure which will be more particularly stated in the Treasurer's Account to be annexed to the Report. A sum of upwards of £30 has been expended in a new boiler to the Greenhouse, and £54 11s. 6d., and £15 6s. 0d., have been respectively paid for objects of antiquity, and for asphaltting the Walks of the Museum. The Marygate Tower has also been repaired at a cost of £39 2s. 4d.

The Antiquarian Department has received some important additions during the past year, the chief of which is the very interesting tomb of Julia Fortunata, wife of (M) Verecundius Diogenes, which was discovered by the excavators of the new Railway buildings in the month of March. It is a remarkable circumstance that the monument of her husband was found at the same place exactly three centuries ago. M. Verecundius Diogenes prepared his own tomb, and it may perhaps be inferred from the absence of any age upon the coffin of the lady, and from the peculiar wording of the inscription, that he made ready the memorial of his wife during her lifetime. The epitaph discloses the fact that she was a native of Sardinia, and the bones in the tomb, which were in a good state of preservation, proved her to have been a tall and masculine person.

The formation of a new road across Scarcroft yielded in the month of May several curiosities, and a fragment of a votive inscription. Other excavations in the same neighbourhood have revealed the interesting fact that the Roman road to Tadcaster did not run through Micklegate Bar, as has been stated by various antiquaries, but a little to the north of it; indeed it seems evident that it did not strike the modern high-road at all on this side of the Village of Dringhouses. It is the intention of the Curator to prepare a map in which the recent discoveries on the Micklegate side of the Ouse will be carefully laid down.

The excavations at the new Railway Station have yielded to the Museum an impression of the body of a female, in gypsum, which is remarkably perfect, and a very fine stone coffin, the largest that the Society possesses, eight feet in length, and proportionately thick. This has been placed in the row of Roman tombs in the Hospitium, and in it has been carefully laid the gypsum in which the body was enveloped.

In the new Ethnological room the large collection of flint and stone implements which the Society possesses has been arranged, and Dr. Gibson has very kindly fastened the specimens to the boards on which they are exhibited.

Considerable progress has also been made in bringing

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together a collection of Pottery of a comparatively recent date, the work of the Northern manufacturers.

The Coin cabinet has received a somewhat important addition through the kind bequest, by Miss Widdowson, of the collection of her late uncle, Mr. James Cook. It contains a large number of Roman and English coins, some of which supply deficiencies in our cabinet. During the year the modern English tokens and the foreign coins have been classified and catalogued by Mr. Norcliffe, who has kindly added to them a number of his own.

In the course of the past year the Society has had an opportunity of acquiring, by purchase, two small collections of antiquities which had been found in York, chiefly derived from the recent excavations at the Railway. It is much to be desired that other collectors would grant to the Society the same privilege. Apart from the city in which they are found, such objects possess a very trifling interest, their chief value is in combination and comparison with others, and this can only be tested in a large public collection such as that in our Museum. It is only a few years since the position of Eburacum as the chief city in Britain was questioned on account of the paucity of memorials of the Romans in our Museum, which were all the while in existence in private collections. This needless slur has been, to a great extent, taken away, but it would disappear entirely if amateurs would permit us to acquire from their museums objects found at York of which we have at present no types, and they would shew the Society equal consideration if they refrained from standing in its way by purchasing objects which ought to be secured for our collection as soon as they are discovered.

The Honorary Curator of Geology reports that the rearrangement of the Yorkshire Geological room is nearly completed; the Lias is being arranged in the following zones:—*Ammonites Jurensis*, *A. Communis*, *A. Serpentinus*, *A. Annulatus*, *A. Spinatus*, *A. Margaritatus*, *A. Capricornus*, *A. Jamesoni*, *A. Oxynotus*, *A. Bucklandi*, *A. Angulatus*, *A. Planorbis*, so as to correspond with the tables in Tate and

Blake's Yorkshire Lias; next follow the Rhætic, Triassic, Permian, Coal measures, Millstone Grit series and Carboniferous Limestone. The collection is very deficient in good specimens from the last named formation.

The Yorkshire collection has been enriched by the donations of our Honorary Member, W. H. Hudleston, Esq., of a fine specimen of *Ammonites Berryeri* from the Upper Calcareous Grit of Kirkdale, and of *Araucaria Hudlestoni* from the Coral-line Oolite of Malton. He has also given a very fine slab of *Trigonia clavellata* from the Coralline Oolite of Weymouth, which is useful for comparison with the slabs of *Trigonia perlata* in our Yorkshire collection.

The general collection has been increased by the presentation of a series of Fossils from the Sponge Gravel Beds near Farringdon, belonging to the Lower Green Sand, by Mr. Whitwell, of Holgate, and a series of Photographs of sponges from E. Davey, Esq., Wantage, Berks. Miss H. M. Crompton has given a fine Fish from the Eocene Beds of Monte Bolca; J. F. Walker, Esq., a large specimen of *Ammonites spinatus* from South Petherton; and the Honorary Curator a Cast of a molar tooth of *Mastodon Borsoni* from the Red Crag, Suffolk.

The Curator of Ornithology reports the addition of the White Spoonbill (*Platalia leucorodia*), to the Rudston collection, which he purchased, having been taken by Anthony Savage in the decoy at Hornby Castle, 1865. He has also to report the capture of two specimens of the large Bittern (*Ardea stellaris*), one killed by Col. Napier at Buttercrambe Moor, on Jan. 10, 1877, which proved to be a female, and another shot at Moss, below Askern, Jan. 9, 1877, by Mr. Hindle, Surgeon, of the latter place, and now in the possession of Mr. Yarborough, Camps Mount. It is remarkable that they were killed on two consecutive days, 20 miles apart. Also a specimen of Honey Buzzard, killed at Kilburn, and a Sea Eagle, on Thornton Moor, Northumberland. A Woodcock's nest was found on Wass Banks, April 20, 1877, on bare ground, composed of a few straws and dried leaves. The Curator has also to record an

interesting race between a Continental express train and a carrier pigeon from Dover to London. The bird was tossed from a carriage window as the train left the Admiralty Pier. The train got up speed of 60 miles an hour and proceeded to Cannon Street without stopping. The pigeon was "housed" in a building in Cannon Street. It took the direct route probably, saving about half-a-mile in the whole distance of $76\frac{1}{2}$ miles, and beat the train by 20 minutes or time allowance of 18 miles.

Two specimens of the Hoopoe (*Upupa epops*), one at Summer Lodge, Richmond, and the other at Tockwith, have been killed during the year; and a white Starling at Holtby.

The Curator of Comparative Anatomy reports that though a large amount of valuable material which had not previously been shewn to the public has been placed in the cases for exhibition, much still remains to be dealt with.

The skeleton of the Irish Elk, one of the most valuable specimens in the collection, the mounting of which was cumbersome and unsatisfactory, is now nearly completely remounted in a most satisfactory manner. It will be placed in the centre of the new Ethnological gallery in close proximity to the Flint implements and other remains of pre-historic man with which it was contemporary. The rest of the collection is now in process of re-arrangement, with a view to the incorporation of the still available material and the more effective display of the whole.

Mr. Wakefield reports:—The past year will be remembered as being remarkable for barometric disturbances, great winds, and an excessive rainfall, although the results are almost the exact means of the observations of half a century, in regard to atmospheric pressure and temperature.

On January 1st a severe storm swept over the country, striking the southern coasts first and seriously damaging the Admiralty Pier at Dover, and the Promenade Piers at Brighton and Eastbourne, but doing little damage in the northern counties. Two others had been recorded, one, which might be

termed the great storm of the year, on account of its duration, occurred on October 14th, the other on November 22nd, equally severe, and probably extending over a larger area.

The mean height of the mercurial column for the year corrected to 32° F. and mean sea level was 29·8403 inches, being ·0853 inch below a mean, and having a range of 2·022 inches from a minimum of 28·686 inches on November 29th, to a maximum of 30·708 inches on October 6th. The barometer fell, however, to 28·600 inches at 6 p.m. on November 11th, with the wind in the south and a velocity of 40 to 48 miles per hour. The barometer had been twice below 29 inches in January, once in March, and five times in November.

METEOROLOGICAL REGISTER, YORK, 1877.

BAROMETER.				RAIN.		THERMOMETER.				
Month.	Highest.	Lowest.	Mean.	Inches.	Days.	Average Maximum.	Average Minimum.	Mean Temp.	Highest.	Lowest.
Jan.	30·558	28·760	29·7303	3·27	24	46·45	35·13	40·79	57	30
Feb.	30·157	29·218	29·6038	2·22	22	48·46	35·93	42·19	55	22
Mar.	30·360	28·994	29·7169	2·85	22	46·39	32·35	39·37	54	21
April	30·246	29·111	29·8065	3·37	17	50·13	37·46	43·80	58	30
May	30·378	29·034	29·8845	2·04	15	54·32	40·06	47·19	64	27
June	30·266	29·319	29·9803	1·43	13	67·63	49·13	58·38	78	41
July	30·201	29·022	29·8354	3·13	15	66·55	51·00	58·77	73	42
Aug.	30·111	29·334	29·8163	4·43	21	66·48	51·35	58·91	75	42
Sept.	30·391	29·637	30·0615	3·33	16	60·13	43·97	52·05	67	35
Oct.	30·708	29·246	29·9379	2·92	19	56·00	40·35	48·17	65	27
Nov.	30·366	28·686	29·5673	2·10	17	50·70	37·53	44·12	59	30
Dec.	30·700	29·150	29·9426	2·18	21	44·58	33·71	39·14	52	26
	30·708	28·686	29·8403	33·27	222	54·82	40·67	47·74	78	21

The temperature for the year was 47°·74, or ·13 above a mean, the highest point being 78° on June 19th, and the lowest 21° on March 1st. On 51 nights it fell to or stood at 32°. The following table exhibits the months of excess and defect respectively.

Excess.		Defect.	
January	4.49	March	.93
February	4.39	April	1.90
June	.28	May	5.01
July	.17	August	.39
October	.07	September	2.55
November	2.52		
December	.44		10.78
	12.36		
	10.78		
	12)1.58		
Excess for the whole year			.13

In London the first week in May showed a deficiency in the temperature of 8° 8 below the mean of 100 years.

The quantity of rain, snow and hail that had fallen amounted to 33.27 inches, being 1.75 inch above the rainfall of 1876, and 9.28 inches above the mean of 50 years. Every month had

RAIN FALL, 1877,

Month.	Total Depth.		Greatest Fall in 24 Hours.		Days on which 41 or more fell.	Malton.		Langton.
	Inches.	Depth.	Date.			Inches.	Inches.	
Jan.	3.27	.84	3		24	3.63	3.575	
Feb.	2.22	.34	25		22	1.95	2.785	
Mar.	2.85	.91	30		22	2.85	2.775	
April	3.37	.70	22		17	3.33	3.635	
May	2.04	.62	17		15	1.79	1.905	
June	1.43	.38	12		13	1.62	1.715	
July	3.13	.70	14		15	3.36	3.410	
Aug.	4.43	.81	25		21	4.10	3.590	
Sept.	3.33	1.11	15		16	3.10	3.190	
Oct.	2.92	.62	23		19	2.44	3.030	
Nov.	2.10	.53	21		17	2.31	2.370	
Dec.	2.18	.96	30		21	2.08	2.490	
	33.27	1.11			222	32.56	34.470	

been much above a mean, with the exception of June, which showed a deficiency of .91 inch [see the following table], and

as a consequence the rivers had been much above the summer level nearly the whole year. The mean rainfall for York is 23·99 inches, having a range of 21·96 inches from a minimum of 17·89 inches in 1850 to a maximum in 1872 of 39·85 inches.

Excess.		Defect.	
January	1·57	June	·91
February	·75		
March	1·26		
April	1·87		
May	·35		
July	·70		
August	1·72		
September	1·12		
October	·50		
November	·03		
December	·34		
	<hr/>		
	10·21		
	93		
	<hr/>		
Excess for the whole year	9·28		

Mean rainfall for 20 years, ending 31st Dec., 1877 25·458 inches.

„ 10 „ „ 27·569 „

„ 5 „ „ 26·006 „

Mean of the three terms . . 26·344 inches.

showing an excess of 2·35 inches above the mean for fifty years; during that period the following years have had a rainfall above 30 inches.

	Inches.	Days of rainfall.	Mean daily rainfall.
1860 ..	30·37	190 ..	·1598 inch.
1876 ..	31·70	194 ..	·1634 „
1877 ..	33·27	222 ..	·1498 „
1848 ..	36·02	192 ..	·1876 „
1872 ..	39·85	216 ..	·1844 „

COMPARATIVE PREVALENCE OF WINDS.

N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.
32	6	18	8	24	5	10	8
S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.
74	23	36	19	41	17	24	20

The following observations made at Langton, Malton, have been kindly supplied by the Rev. A. Shadwell, M. A.

Rain fall 7·33 inch over average. Rivers above summer level the whole year. Flood in Derwent January 4th, 11 ft. 2 in. ; April 20th, 8 ft. 2 in. ; September 16th, 8 ft.

Mean height of Barometer, 29·997 corrected for level and temperature.

WINDS.

S. to W.	W. to N.	N. to E.	E. to S.	Calm.
152	93	58	51	11

Thirty-three new Members, six Ladies, and four Associates have been elected during the past year, whilst twelve Members, eight Lady Subscribers, and two Associates have been lost to the Society either by death or resignation during the year. Amongst those whose names will no longer appear on the Society's roll is that of our late honoured Vice-President, the Rev. John Kenrick.

The Rev. John Kenrick joined the Society on its foundation in the year 1823, as his name appears in the first list of its Members published in the year 1824. Over a period of upwards of fifty years he continued to aid, by his labours and his experience, the Society of which he had been one of the first promoters, and so long as the Society lasts, the numerous papers published in its Transactions, of which he was the author, on almost every branch of antiquities and antiquarian literature will remain an enduring evidence of his profound learning. Mr. Kenrick not only added renown to the Society by these labours, but from an early period he took an active part in the administration of its affairs. In 1824 his name first appears on the list of the Council, and from that date it has remained

on our list as one of its principal executive officers. On the death of his father-in-law, the late Rev. C. Wellbeloved, he succeeded to the Curatorship of the Antiquities in this Museum, with which department his labours were more intimately associated during the last sixteen years of his life. Apart from this Society the name of Mr. Kenrick was well-known, and took high rank in the world of literature. In 1850 he published in 2 vols., "The History of Antient Egypt under the Pharaohs;" and in 1855 a History of "Antient Phœnicia." During his long residence in York, Mr. Kenrick was an active promoter of those Societies founded in our city which have for their object to promote learning or to alleviate suffering; and his loss is deeply mourned. He died at York on May 7th last in the 90th year of his age. In his will Mr. Kenrick remembered the Society with which his name had been so intimately associated, and a bequest contained in it has been the means of adding to the Society's Library a valuable series of books, a list of which will be published in this Report.

Mr. Thomas Gott, of Knaresbro', one of the Honorary Members of the Society, has also died during the past year. Mr. Gott will be remembered as a gentleman who took much interest in our Museum, and, on more than one occasion, presented to the Antiquarian department several very valuable objects of Roman Antiquity.

The following Lectures have been delivered in the Theatre of the Museum during the past year.

SUBJECT.	NAME OF LECTURER.
The History of the Potter's Art in Britain	F. W. RUDLER, Esq., F.G.S.
The Giant Planets	
	R. A. PROCTOR, Esq., B.A., F.R.A.S.
Wind and Weather	REV. ARTHUR SHADWELL, M.A.
Second Lecture on do.	Do.
Spenser's Faerie Queen.....	REV. GEORGE ROWE, M.A.
New Zealand	T. B. WHYTEHEAD, Esq.
Public Health and Sanitary Laws	S. W. NORTH, Esq., F.G.S.
The History of the Alphabet ..	REV. ISAAC TAYLOR, M.A.

SUBJECT.	NAME OF LECTURER.
Recent Geological Speculations	PROF. DUNCAN, F.R.S.
The Galvanic Battery	R. ROUTLEDGE, Esq., B.Sc., F.C.S.
Second Lecture on do.	Do.
Jerusalem as it is	REV. F. LAWRENCE, B.A.
Modern Greece	J. W. BARRY, Esq., B.A.

During the past year the Council have allowed the use of the Theatre of the Museum for a series of Lectures given under the auspices of the Cambridge University Extension Society. It is gratifying to the Council to learn that these lectures, chiefly on scientific subjects, yet embracing others not within the scope of the Society, have been a great success, and must be the means of affording to many the opportunity of acquiring a knowledge of science.

The Council propose for election the following gentlemen, well known in the scientific world, as Honorary Members of the Society: William Carruthers, F.R.S., F.L.S., F.G.S., British Museum; Henry Woodward, F.R.S., F.G.S.; Henry Clifton Sorby, F.R.S., F.G.S.; W. S. Dallas, F.L.S., Secretary of the Geological Society; Robert H. Scott, M.A., F.R.S., F.G.S., Director of the Meteorological Office; L. C. Miall, F.G.S., Professor of Biology in the Yorkshire College of Science, Leeds; Robert McLachlan, F.R.S., F.L.S., &c.; Rev. T. G. Bonney, M.A., F.S.A., F.C.S., F.G.S., Professor of Geology, University College, London; Dr. Augustus Voelcker, F.R.S., F.C.S., Professor of Chemistry to the Royal Agricultural Society; H. T. Stainton, F.R.S., F.L.S.; Sir Wyville Thompson, F.R.S.

The following Members of Council retire according to the rules of the Society, and are not eligible for re-election at the present: Joshua Oldfield, Esq., Mr. Ald. March, Edward Allen, Esq., and Frederick L. Mawdesley, Esq.

The Council propose the following Members of the Society as new Members of Council: Mr. Ald. Melrose, Rev. Robert Daniel, A. H. Spence, Esq., W. L. Newman, Esq., and Mr. Barnby in the room of Dr. Gibson, elected a Vice-President.

LIST OF SUBSCRIBERS

TO THE

ENTRANCE LODGE IMPROVEMENT FUND.

	£.	s.	d.
His Grace the Archbishop of York, President of the Society	25	0	0
Aldam, W., Frickley Hall	5	0	0
Anonymous	5	0	0
Barber, J. S., Osbaldwick Cottage	2	0	0
Bell, W. H.	5	0	0
Bleasdale, G.	5	0	0
Cattley, T., Brandsby	3	0	0
Colburn, J., the late	5	5	0
Cowling, H.	10	10	0
Cussons, G.	2	0	0
Davies, R., the late	10	10	0
Duncombe, the Hon. and Very Rev. Dr.	10	0	0
Ellis, T.	105	0	0
Ford, J., the late	10	10	0
Gowland, W. T.	2	2	0
Gray, Wm.	25	0	0
Harcourt, E. V., Whitwell Hall	25	0	0
Hey, the Ven. Archdeacon	5	0	0
Hoggard, J., the late	2	2	0
Johnson, R.	5	0	0
Jones, G. F.	10	0	0
Kenrick, Rev. J., the late	5	0	0
Leeman, G., M. P.	25	0	0
Lloyd, Miss Ann, Stockton Hall	5	0	0
Lowther, J., M. P., Swillington	25	0	0
March, J.	5	0	0
Matthews, P.	5	0	0
Mills, J. R.	10	0	0
Millward, C. A.	2	2	0
Munby, J., the late	10	10	0
Noble, T. S.	10	10	0
Norcliffe, Mrs.	10	0	0
Oldfield, G., Dringthorpe	20	0	0
Oldfield, J.	25	0	0
Padel, C. G.	1	1	0
Peckitt, H., Carlton Hushwaite	5	0	0
Pearson, R.	5	0	0

Carried forward .. £447 2 0

								<i>£.</i>	<i>s.</i>	<i>d.</i>
						Brought forward	..	..	447	2 0
Prescott, R.	..	..	..	..	..	..	..	..	5	0 0
Procter, W., M. D.	..	..	..	..	..	..	..	..	5	0 0
Read, W. H. Rudston	..	..	..	..	..	..	..	..	10	10 0
Reed, W.	..	..	..	..	..	..	..	..	10	10 0
Richardson, H.	..	..	..	..	..	..	..	..	10	0 0
Richardson, W. B.	..	..	..	..	..	..	..	..	10	10 0
Robinson, Rev. J.	..	..	..	..	..	..	..	..	5	0 0
Roper, J., the late	..	..	..	..	..	..	..	..	25	0 0
Smithson, E. W.	..	..	..	..	..	..	..	..	20	0 0
Sotheran, H.	..	..	..	..	..	..	..	..	5	0 0
Sotheran, W.	..	..	..	..	..	..	..	..	10	10 0
Spence, A. H.	..	..	..	..	..	..	..	..	5	5 0
Steward, H., the late, Bishopthorpe	..	..	..	..	..	..	..	..	5	5 0
Smith, Rev. G. Vance	..	..	..	..	..	..	..	..	2	2 0
Swann, Clough, and Co.	..	..	..	..	..	..	..	..	21	0 0
Terry, J.	..	..	..	..	..	..	..	..	10	10 0
Thomas, W., the late	..	..	..	..	..	..	..	..	1	1 0
Walker, J. F.	..	..	..	..	..	..	..	..	10	10 0
Walker, W.	..	..	..	..	..	..	..	..	25	0 0
Weatherley, Ralph	..	..	..	..	..	..	..	..	5	0 0
Whitehead, G.	..	..	..	..	..	..	..	..	10	0 0
Whytehead, W.	..	..	..	..	..	..	..	..	10	10 0
Wilkinson, J.	..	..	..	..	..	..	..	..	10	10 0
Wolstenholme, G.	..	..	..	..	..	..	..	..	2	2 0
Varvill, R.	..	..	..	..	..	..	..	..	1	0 0
Woodd, B. T., M. P., Conyngham Hall	..	..	..	..	..	..	..	..	5	0 0
								<hr/>		
								Total	£688	17 0
								<hr/>		

STATEMENT OF EXPENDITURE
ON ACCOUNT OF THE
ENTRANCE LODGE IMPROVEMENT FUND,
31st DECEMBER, 1877.

						<i>£.</i>	<i>s.</i>	<i>d.</i>
Preliminary Expenses	..	..	..	..	..	11	4	6
Cost of Temporary Lodge	..	..	..	..	..	62	17	6
Cost of Building New Lodge	..	..	..	..	..	916	6	6
Cost of Gates, Palisades and Lamps	..	..	..	..	..	188	16	11
Cost of Laying out the Approaches	..	..	..	..	..	68	8	10
Cost of Concreting the Walk	..	..	..	..	..	36	19	0
Architect's Charges	..	..	..	..	..	74	6	0
						<hr/>		
						1353	19	3
Total Amount of Subscriptions to the Improvement Fund								
(see page 21)	..	..	..	..	..	688	17	0
Sale of Temporary Lodge	..	..	..	..	..	15	0	0
						<hr/>		
						703	17	0
						<hr/>		
						650	2	3
Balance in Treasurer's Hands, 31st Dec., 1877	..	..	..	..	..	231	11	9
						<hr/>		
Total Liabilities of the Society, 31st Dec., 1877 (independent								
of the Permanent Debt)						£418	10	6
						<hr/>		

W. GRAY,
Treasurer.

Audited and found correct
2nd March, 1878,
F. L. MAWDESLEY.

MEMBERS ELECTED IN 1877.

Atkinson, Albany, 22, *Bootham Terrace*.
 Barry, John Warren, *Heworth Hall*.
 Bass, Joseph, 34, *Parliament Street*.
 Bollans, Robert Henry, 14, *High Petergate*.
 Brown, Eleanor, 49, *Monkgate*.
 Champernowne, Capt., R. E., *Lord Mayor's Walk*.
 Coke, Capt., *Militia Depôt*.
 Croft, Michael, *Lendal*.
 Fletcher, Allen, 6, *Lord Mayor's Walk*.
 Goadby, Edwin, 16, *Bootham*.
 Gray, Alan, *Minster Yard*.
 Grayston, Elton, *Coney Street*.
 Grimwood, Charles, 20, *Coney Street*.
 Hodgson, Mrs., *Stonegate*.
 Hood, William, *Castlegate*.
 Houlden, William, *Union Terrace*.
 Jubb, William, 9, *Micklegate*.
 Lewis, William, *Stonegate*.
 Marchant, Robert, *Petergate*.
 Mawson, Miss, 3, *St. Mary's*.
 North, Arthur William, *Union Bank*.
 Peart, Joseph, 41, *The Mount*.
 Proctor, John William, 23, *St. Paul's Square*.
 Prudames, Samuel, *Low Ousegate*.
 Richardson, Mrs., *Bootham*.
 Russell, William James, *Heworth*.
 Smith, Charles, *High Ousegate*.
 Stamp, Thomas, *Marygate*.
 Taylor, John, *Coney Street*.
 Wade, Mrs., 31, *Bootham*.
 Walker, Charles, *Marygate*.
 Wilberforce, Rev. W. F., *St. Oswald's Terrace*.
 Wilkinson, Edward Towler, *Micklegate*.

LADY SUBSCRIBERS ADMITTED IN 1877.

Child, Miss, *Trinity Lane.*
 Edward, Mrs., 9, *Markham Street.*
 Fowle, Mrs., *Clifton.*
 Haynes, Mrs., 37, *St. Mary's.*
 Rougier, Miss, 1, *South Parade.*
 Walker, Miss, 20, *St. Mary's.*

 ASSOCIATES.

Denison, George, *St. Leonard's Place.*
 Leeds, Charles Edward, 24, *Portland Street.*
 Hutchinson, William Hilton, *Bootham.*
 Raven, Vincent, *East Mount Road.*

 RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEBRUARY 5TH, 1878.

—o—

1. That the Report of the Council now read be adopted and printed for circulation amongst the Members, Lady Subscribers, and Associates of the Society.

2. That the thanks of the Society be given to the Members of Council retiring from office, also to the Treasurer, Secretary, and Curators for their valuable services; and that authority be given to the Council to give admission to the Public to the Museum on Whit-Monday and Tuesday, under the same regulations as last year.

3. That the thanks of the Meeting be given to the Chairman.

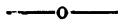
DONATIONS TO THE MUSEUM.

GEOLOGY AND MINERALOGY.

Crompton, Miss Henrietta M.	} Specimens of Fossils and Minerals.
Clayton, Capt.	
Edson, Mr. G.	Fossils from the Gault, East Wear Bay, Folkestone.
Gibson, Dr.	Six Fossils from Brandsby and North Grimston.
Hudleston, Mr. W. H., London	} Bones of the Moas, from New Zealand. <i>Araucarites Hudlestoni</i> , from the Coral- line Oolite, Malton. <i>Ammonites Berryeri</i> , from the Upper Calcareous Grit, Kirkdale Cutting. Slab of <i>Trigonia clavellata</i> , from the Trigonia beds of the Corallian Series, Weymouth.
Lawrence, Rev. F.	
Percival, Mr. S. G.	Fragment of Stalagmite, from Ephesus.
Raine, Rev. Canon	Polished Section of <i>Cyathophyllum regium</i> , from the Yorkshire Coast.
Reed, Mr. W.	Specimens from the Coal Measures of Durham. Coral, from Nunnington.
Walker, Mr. J. F.	Cast of Molar of Trilophodont Mastodon (<i>Mastodon Borsoni</i>).
Whitwell, Mr. W.	<i>Ammonites spinatus</i> , from the Middle Lias, South Petherton.
Widdowson, Miss, The Executors of the late..	} Specimens of Sponges, from Faringdon. A Collection of Precious Stones, and Polished Stones from the Yorkshire Coast.

ZOOLOGY.

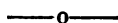
- | | |
|---------------------------------------|--|
| Crompton, Miss Henrietta }
M. | } Specimens of Shells. |
| Raine, Rev. Canon | |
| | A Longicorn Beetle (<i>Monochammus dentator</i>). |
| Read, Mr. W. H. Rudston | A Spoonbill (<i>Platalea leucorodia</i>), killed by Anthony Savage, Gamekeeper to the Duke of Leeds, on the Hornby Decoy, near Bedale, 1865. |
| Walker, Mr. J. F. | Two Colorado Beetles. |
| Walker, Mr. T. | Albino specimen of the Rook. |
| | Do. Blackbird. |



ANTIQUITIES.

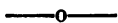
- | | |
|---|---|
| Acton, Mr. G. | Pieces of Stained Glass, with some recipes for making it, by Peckitt, the York Glass Stainer. |
| Dixon, Mr. W..... | A Sword, temp. Geo. III. |
| Eccles, Mr. | A Glass Bottle, 18th sæc. |
| Edson, Mr. Geo. | Part of a Roman Urn, from Malton. |
| Gibson, Dr. | Two Armorial Seals, 18th sæc. |
| Healy, Rev. E., <i>Copman-</i>
<i>thorpe</i> | } A series of Casts from the Poniatowski
Gems. |
| Jones, Mr..... | |
| | Piece of Carved Oak Screen-work, from Old Belfrey Church. |
| Morrell, Mr. W. W. | Eight Silver Coins of Elizabeth, James I., and Charles I. |
| Nelson, Mr. F..... | Part of a large Jet Hair-pin. |
| N. E. Railway, Directors of | Inscribed Coffin of Julia Fortunata. |
| | Stone Coffin, with Cast of Body. |
| | Perfect Cast of Woman, from a coffin. |
| | Two Jet Pins. |
| | Cinerary Urn, Glass Vessel, and Cup inscribed DAMI. |
| Newton, Robinson, and)
Brown, Messrs. | } Three broken Mediæval Vessels.
Two fragments of Saxon Combs.
A Spindle-whorl of bone. |
| | |

- Norchliffe, Rev. C. B. Many foreign Coins, in Silver and Copper.
Impression of Great Seals of Charles II., George III., and William IV.
- Reed, Mr. W. Stone Axe, from Mornington, New Zealand.
- Seller, Mr. G. Old Key, found in Fossagate.
- Smith, Mr. W. Lower Maxillary of Human Skull.
- The Dean and Chapter of York } Several Carved Stones of Norman work, taken out of the Old Library of York Minster.
An early English Capital from the South Transept.
- Walker, Mr. J. F. Knife Handle of wood, from Cambridge.
- Widdowson, Miss, The } A collection of Coins made by the Executors of the late ..) late Mr. Jas. Cook.
A Roman Gold Ring.
- Wilson, Mr. D. Skull of *Bos longifrons*, found in King's Square.
- Wolstenholme, Mr. C. D. Mediæval Tyg, from Plymouth.



MISCELLANEOUS.

- Wood, Mr. W. Specimen of Cloth from the bark of the Paper Mulberry.
Plait and Shaving from the bark of the Cocoa Nut.



LIBRARY.

- Anne, Mr. Geo., Burgh- } The Astronomical M.S.S. of the late wallis Hall } Edward Pigott.
- Association, British, for the } Report for 1876.
Advancement of Science }
- Association, Geologists' .. Proceedings, vol. v., Nos. 1 and 2.

- Author, The On the Artesian Well at St. Clement's,
Oxford, by J. Prestwich, M. A.,
F. R. S.
- Author, The Das Innere der Vancouver—Insel, von
Robert Brown.
- Authors, The On the Corallian Rocks of England,
by Rev. J. F. Blake, M. A., F. G. S.,
and W. H. Hudleston, Esq., M. A.,
F. G. S.
- Club, Tyneside Naturalists' } Natural History Transactions of
Field } Northumberland and Durham, vol.
v., pt. 3.
- Club, Warwickshire Field Proceedings for 1876.
- Davey, Mr. Photographs of Sponges from Faring-
don.
- India, Geological Survey of Palæontologia Indica, series x., pt. 2,
and series xi., pts. 1, 2.
Memoirs of do., vol. xii., pts. 1, 2, and
vol. xiii., pts. 1, 2.
Records of do., vol. ix., pts. 2—4, and
vol. x., pts. 1, 2.
- Institution, Royal, of Great }
Britain } Proceedings, Nos. 64, 65.
- Institution, Smithsonian.. Report for 1875.
Geological Survey of the Territories,
vol. 2. (E. D. Cope's Cretaceous
Vertebrata).
- Kenrick, Mrs. Thesaurus numismatum Imperatorum
Morellianus, 5 vols., fol.
Imperium Orientale Banduri, 2 vols.,
fol.
Glossarium ad Scriptores mediæ et
infimæ Latinitatis, Du Cange,
6 vols., fol.
Glossarium novum ad Scriptores medii
ævi, Carpentier, 4 vols., fol.
Orellii Inscriptiones, 3 vols., 8vo.
Inscriptiones antiquæ totius orbis
Romani Gruteri, 4 vols., fol.
Recueil de Medailles de Rois, 9 vols.,
4to.

- Kenrick, Mrs. Recueil de Monumens Antiques, par
Grivaud de la Vincelle, 4to.
Recueil d'Antiquités Egyptiennes,
Etrusques, Grecques et Romaines,
7 vols., 4to.
The Coinage of England, by T.
Snelling, 4to.
Aquæ Solis, or Notices of Roman
Bath, by Rev. H. M. Scarth, 4to.
The Yorkshire Library, by W. Boyne,
4to.
- Publishers, The Nature (Journal) for 1877.
Read, Mr. W. H. Rudston Journal of the Linnean Society:
Zoology, Nos. 66—73.
Botany, Nos. 87—92.
- Society, Chemical..... Journal for 1877.
Society, Geological Journal, Nos. 129—131.
- Society, Hull Literary and }
Philosophical } Report for 1876—77.
- Society, Leeds Literary and }
Philosophical } Report for 1876—77.
- Society, Leicester Literary }
and Philosophical } Report for 1876.
- Society, Meteorological .. Meteorological Data for the nine 10°
Squares, Lat. 20° N. to 10° S. Long,
10° to 40° W.
Quarterly Weather Report, pts. 3, 4,
1874.
Report of the Permanent Committee
of the First International Congress
at Vienna, Meeting at London,
1876.
Report of Meteorological Committee
of the Royal Society.
- Society, Royal, of Edin- }
burgh } Transactions, vol. xxvii., pt. 4.
Proceedings, Session 1875—76.
- Society, Warwickshire }
Natural History and } Report, 1876.
Archæological }
- Society, Zoological Transactions, vol. ix., pts. 10, 11, and
vol. x., pts. 1, 2.

SERIAL WORKS SUBSCRIBED FOR.

Corpus Inscriptionum Latinarum (4 vols. with Atlas of Plates and Supplement published).

Birds of Asia, by John Gould, F. R. S.

Natural History of the Tineina, by H. T. Stainton, F. R. S.
(13 vols. published).

Nautical Almanack.

Proceedings of the Zoological Society, with Illustrations.

Publications of the Palæontographical Society (30 vols. published).

Publications of the Ray Society.

Sowerby's Thesaurus Conchyliorum, col. plates (32 parts published).

London, Edinburgh, and Dublin Philosophical Magazine.

Annals and Magazine of Natural History.

Geological Magazine.

Journal of the British Archæological Association.

Numismatic Chronicle.

Memoires de la Société Paléontologique Suisse.

D'Orbigny's Paléontologie Française.

COMMUNICATIONS
TO THE
MONTHLY MEETINGS
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,
1877.

APRIL 3RD.—DR. PROCTER read the following paper on the Composition of some of the Colours used by the Romans :—Almost all the knowledge which the Romans had of colours for decoration is to be derived from Pliny's Natural History, which is in truth a vast encyclopædia of ancient knowledge and belief upon every known scientific subject, with quotations from between four and five hundred authors.

In the portion of that work devoted to mineralogy, including mineral colours, Pliny cites thirty-six authors. Of these, I believe, only the writings of Vitruvius, and the meagre treatise of Theophrastus, written 300 B.C. are now extant.

It is, therefore, a matter of interest to translate the substances which he describes into their modern names, or, in other words, to identify them. But the manner in which he has collected, and especially grouped together the mass of matter, has caused it to lose a great portion of its value from the mixture of fable and truth he has written, as well as from the difficulty, in some cases impossibility, of discovering exactly the special object of which he is speaking. This arises mainly from the absence of the relation of essential characters or a mention of them in detail. The description of natural objects is most scanty and imperfect, although it is true that if he had given minutely the characters of every object, he would have swelled his book to a most enormous size; nevertheless a deficiency of this kind increases the difficulty of recognising

some substances, regarding which he sets down only the most apparent, and often unimportant characters, as colour, weight, locality, &c.

For the origin of the pigments employed by the Romans in decoration, we must, in a great measure, look to the Greeks. The pictures of the great Greek Masters are entirely lost. They disappeared during the wars waged by the Romans with the successors of Alexander, and the later Greek republics. The subjects of many of these pictures are described by Pliny and other classical authors, and some idea of the manner and style of the Greek artists may, I presume, be gained from the designs of the so-called Etruscan vases which were executed by the artists of Magna Grecia, and some of which are probably copies of celebrated works or portions of them; whilst some faint notion of their execution and colouring may be gained from the paintings in fresco found at Herculaneum and Pompeii. It may truly be said that these paintings are not of Greek execution, yet we are certain at the period when Rome was the metropolis of the world, that the fine arts were cultivated in that city almost entirely by Greek artists, or at least by artists of the Greek school. Pliny is diffuse on this subject in book xxxv., and by comparing his descriptions with those of Vitruvius and Theophrastus, it will be found that the same materials for colouring were used at Rome and Athens. Pliny mentions thirty great painters, whose works were known to the Romans, of these only two are expressly mentioned as being born in Italy, and the remainder were Greeks.

Whatever may be their origin we do know that the colours used by the Romans were brilliant, and the contrasts of the frescoes strong, and those competent to form an opinion consider them to be of much excellence, and in fact the minor ornaments have led to the foundation of the Arabesque style, largely used for decoration in modern times. But there is another point of view besides that of art proper, from which they may be viewed by affording information with respect to the nature and chemical composition of the colours used by these ancient artists, and it is that which I propose to consider.

I had lately given to me small portions of several colours on walls from Pompeii. These with some similar portions obtained from a Roman Villa, at Collingham, excavated some years ago, have been made the subject of experiment.

The colours were—yellows, greens, reds, and a rose colour.

The yellows were three in number, and I found No. 1 to be a yellow ferruginous earth with clay. No. 2 was Limonite, mixed with gypsum. No. 3 was a yellow mixed with chalk.

It is in the first place proper to mention that the word Ochre is applied in mineralogy to any product of decomposed ores, as Cobalt ore, &c., but in ordinary and popular language, and without definite accuracy, it is applied to any combination or mixture of the earths with iron which can be used for pigments and the like. Hence, as the colour is light or dark, we have yellow, red, and brown ochres. They are produced by the disintegration of iron ores, and notably of the Hematite forming the red, and of Limonite, or the hydrated oxide of iron, giving rise to the formation of the lighter ochres, the tint being moreover varied by admixture in different quantities with light coloured earths. The admixture of them, I found, with clay, chalk or gypsum, admits of a probable explanation, by reference to Pliny who tells us that certain colours were mixed with other substances to render them lighter, and thus obtain various tints, whilst other colours required an under coating, or some preparation of the surface for their reception. This latter statement may account for the presence of gypsum in No. 2, assuming that it did not happen to be an ingredient of that particular ore from whence the colour was obtained.

Pliny describes numerous colours under different names, all of which appear to be those which we should now call ochres. "Sinopis, the author writes, was discovered in Pontus, and hence its name from the city of Sinope. It is produced also in Egypt, and the Balearic isles, but the best is found in Lemnos and Cappadocia, being extracted from quarries there. In the native mass it has its own proper colour within, but is spotted on the exterior, the ancients made use of it for tone." Pliny here uses in the original the word "splendor" supposed by Wornum to be the equivalent of our word tone, which

comprehends both the tone and harmony of the Greeks. Our author then continues,—“ There are three kinds of Sinopis, the pale, the red, and the intermediate. It is used both with the brush and for colouring wood. That which is of the deepest red is used for colouring partitions. The Sinopis known as the dull (*pressior*) is tawny, and is used principally for the lowest partitions.”

Then he speaks of Rubrica, which is either red ochre or oxide of iron, as a better kind of Sinopis, highly esteemed, and only sold in sealed vessels, hence called Sphragis, and as being used to adulterate or give an under coating to minium, which is probably a vermillion, and that it is found in Egypt and Arabia in iron mines. Another variety he describes thus—“ It is from Rubrica that ochrea is prepared. The Rubrica being burnt in new earthen pots, well luted with clay, and is very useful for plasters by reason of its desiccative properties.”

Other varieties he describes under the term sil, which were in all probability ochres.

Thus then there can be no doubt that these various forms of ochre were used by the Romans as yellow, brown, or red pigments variously modified in their tints or shades by admixture with neutral substances, as we employ those minerals in the present day.

The green colours which I examined were two in number,

No. 1 was composed of the protoxide and a little peroxide of iron, silica, lime, alumina, and carbonic acid.

This appears to be an exception to the usual ancient green pigments, which generally contain copper, whilst in this substance none is present. It is a carbonate of protoxide of iron or ferrous carbonate, with chalk, alumina, silica and a little ferric oxide. The only substance that I can find given by Pliny, agreeing with it occurs in this passage. “ There are also two colours of very inferior quality which have been recently discovered. One of these is known as Appianum, a fair imitation of Chrysocolla. This colour is prepared from a green chalk.” This passage is readily understood as we are acquainted with several minerals of a green colour which owe that colour to ferrous compounds.

The green colour, No. 2, is a much altered substance containing copper, and is probably the Chrysocolla of Theophrastus, Vitruvius, and Pliny. The mineral which we now term Chrysocolla, is a hydrated silicate of copper, whilst that of the ancients there is every reason to believe was the carbonate (Malachite). This will be seen from Pliny's description, bearing in mind that copper is often found mineralised with gold, silver, and lead. "Chrysocolla is a liquid which is formed in the shafts flowing through veins of gold, a kind of slime which becomes indurated by the cold of winter until it has attained the hardness even of pumice. The most esteemed kind is found in copper mines. He then describes how an artificial Chrysocolla may be manufactured by allowing water to percolate through a vein of the metal, and allowing the former to evaporate."

Of the two reds which were examined, one was a dull red ochre, its colour being derived from ferric oxide. Several red earths used in painting are described by Theophrastus and Pliny as the Sinnian earth, the Armenian earth (Bole) and African ochre which had its red colour produced by calcination.

The other red was a compound of lead and probably minium. The red lead oxide was known to the Greeks under the name "sandarake."

In parts of Pliny's descriptions there is some confusion between minium and cinnabar. He says that sandarach was a product of an island in the Red Sea, then he tells us "that there is a spurious kind prepared by calcining cerusse in the furnace," and that this was discovered accidentally by means of a fire at the Piræus at Athens. Some cerusse i.e. white lead which had been exposed to the fire was found converted into minium, and afterwards the process was imitated artificially. He likewise describes another colour Sandyx, and which Beckman, from a passage in Virgil, considers it to be our madder, Pliny also remarks that Virgil has taken Sandyx to be a plant. But the naturalist's description shows that this could not be true, for according to him it is prepared by calcining equal proportions of rubrica and sandarach, and the only effect of this operation would be to alter the tint of the pigment, and to give it a more crimson hue.

From Sandyx and Sinopis, another colour, Syricum, is prepared, which Pliny says is used to adulterate first-class minium, and he continues "one motive for giving an undercoat of Syricum is the evident saving of expense, which results therefrom." He has previously, in another passage, told us that the more expensive colours were furnished to the painters by the employers, and says—"Minium in another way affords a very convenient opportunity to painters for pilfering by washing their brushes filled with colouring matter, every now and then. The minium of course falls to the bottom, and is thus so much gained to the thief."

In the description of these substances there is evidently some confusion between these several modifications of minium and cinnabar or vermillion, which was both known and used by the Romans.

The remaining pigment which I examined was of a rose colour. I have had with this specimen great trouble to determine its composition, and I am not as yet thoroughly satisfied regarding its exact nature. The outer portion exposed to the air is of a cream colour, but the interior has a rose tint. It consists of a fine white clay with chalk and some colouring matter. Having satisfied myself that this colouring matter was not mineral but of organic origin, I endeavoured to ascertain with what colours derived from this source, and known to the Romans, the pigment in question corresponded.

The Porfura of the Greeks, and the Purpurissimum of Pliny was a colouring matter derived from species of shell fish belonging to the genera *Murex* and *Purpura*. Vitruvius says that the fish from the northern countries afforded a more violet, and those from the southern coasts a redder colour, and Pliny says, that for the use of painters, "argentine creta" was dyed with it.

It is necessary here to remark that the antients do not appear to have been acquainted with the difference between calcareous and aluminous earths, and that "creta" was a term applied by them to every fine white earthy powder. Both Vitruvius and Pliny say that in reference to this particular instance, it was adulterated or imitations made of it by

tinging creta with madder and hyssinum, a dye derived from a plant unrecognised, although called by Pliny the hyacinth.

The finest purpurissimum had a tint like that of a deep coloured rose, and was laid on a picture to give the last lustre to sandyx (red ochre) and to produce the brilliant colour of vermillion, but if it was desired to produce a purple, then a coat of ceruleum (probably copper ochre) was laid beneath, and one of purpurissimum with egg, upon it.

The second colour which the pigment in question might be is madder, called by Dioscorides "eruthodanus" or "ereathodanus," of the identity of this substance with our madder there can be but little doubt. Under the kermes berry our cochineal is described—"the holm oak with its scarlet berry. It is produced in Galatia, Africa, Piscidia, and Cilicia; the most inferior kind is that of Sardinia."

This mistake of the Roman author in describing an insect as a berry, is an excusable one, as it was a long time before the nature of the Coccus was understood. The Coccus Ilicis is here alluded to, and is found on the Ilex or Quercus Coccifera.

My colour so far agrees with either of the two preceding, inasmuch that it forms a lake with alumina, and it is the abundance of the latter to which its permanency may be due. Whilst agreeing in this matter, in other respects they present marked differences. The ancient colour is more permanent than a true vegetable lake would be, and they do not agree in some chemical reactions, especially in the action of chlorine upon them. Under the influence of this agent the ancient colour becomes more purple, and is remarkably stable when compared with a true madder or cochineal lake. So that I am inclined to think that if this pigment is not a lake derived from purpurissimum, that into the composition of this colour it at least enters combined probably with kermes and madder.

Pliny says that the celebrated Greek painters only employed four colours—(1) White Melian earth, or more rarely cerussa; (2) Rubrica; (3) Yellows; and (4) Blacks; but he gives a list of 17 besides several combinations used in his time. This statement arose probably from an imperfect recollection of a passage of Cicero. His statement may be true when applied

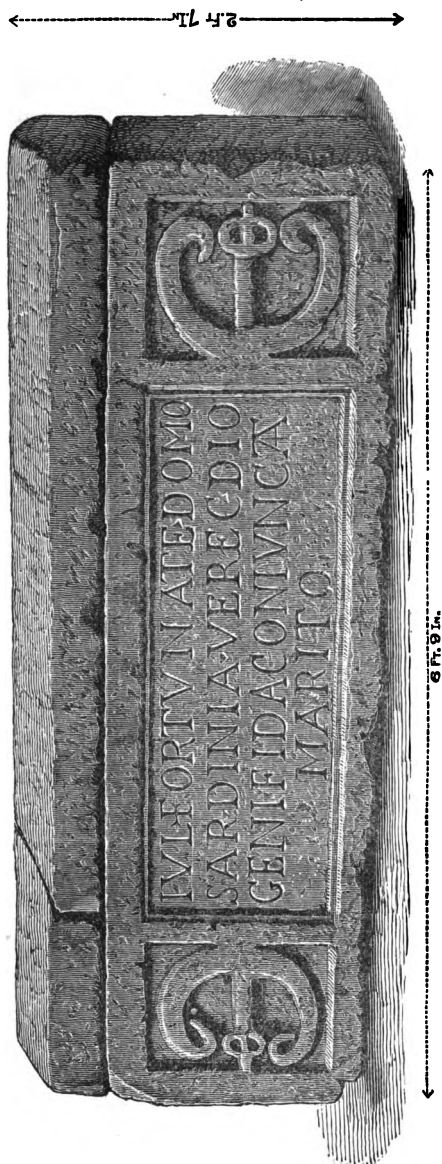
to the earliest Greek painters, to the time of Apelles. But those of the later school all evidence serves to show were perfect masters in all the resources of colouring both in variety of tints as well as means of producing effect and harmony.

This examination, limited as it is, seems to show that mineral colours were most extensively employed by the Romans as pigmentary substances, arising in all probability from a knowledge that they possessed greater permanency than those obtained from the organic kingdom, and likewise that pure native minerals, without artificial preparation, were adopted and this serves to account for the numerous small quantities of foreign matters found in their pigments. The presence of alumina in large quantities with colours of animal or vegetable origin, would also seem to demonstrate, that they were acquainted with the method of preparing those compounds which we now call lakes, which are simply vegetable colours precipitated in combination by that earth, giving them greater brilliancy, and in the generality of cases, more permanence than the colour alone would possess. It would be somewhat interesting to learn whether they were acquainted with the property which tin possesses, as well as alumina in this respect.

OCT. 2ND.—The REV. CANON RAINE read a paper on some Roman curiosities recently discovered in York. He stated that in the summer of 1874 a remarkable sculptured stone was discovered by the workmen who were making an entrance to the new railway station through the mediæval wall of the city. It represents a rude headless figure of a deity with wings, leaning against what seems to be a seat. The right hand, most of which is lost, seems to have held a staff, the left has a bunch of keys. Around the middle of the figure is a girdle or apron, curiously fringed with something running or coiling round it. Under the feet is a plinth or label containing a fragmentary inscription, the D being on the outside. It may be read as follows :—

VOL· IRE
D ABIMANIV

The figure was probably placed in a niche in some building,



MONUMENT OF JULIA FORTUNATA, WIFE OF M. VERECUNDIUS DIOGENES, SEVIR OF THE COLONY OF EBURACUM.
FOUND IN YORK, 1877.

and still retains traces of the white paint with which it seems to have been covered. It is possible also that on certain special occasions it was carried about in procession, shoulder high, as may be seen in some of the sculptures from Nineveh. It has been designedly injured; the head is gone, and the inscription is mutilated. This is probably another example of early Christian intolerance. The reading of the inscription has taxed the ingenuity of many.

I shall now give you, with some remarks of my own, a short abstract of a learned paper on the subject by Professor Hübner, of Berlin, which he has published in the Transactions of the Archæologists of Bonn. Dr. Hübner, before explaining his own views, takes the Aristotelian method of shewing how each of the previous interpretations is inaccurate. The letter D, as he observes, in the left corner, might pre-suppose the existence of M on the opposite side, which is now broken away. If the M was intended for *Manibus*, we have a funereal inscription; but, independently of anything else, the winged figure of the deity forbids such a supposition.

Another suggested reading has been *Deo Magno Volusius Irenæus Arimanius posuit*. Now Arimanius was an Eastern deity, representing the minister of evil, in opposition to Mithras. This reading, however, cannot be assented to, as the last letter in the word Arimanius upon the stone is not O, but a portion of U or V.

Then, again, it has been conjectured that on the right hand corner there might have been the letter M as an abridgment for *Mithræ*, the Sun-god, the beneficent source of life and heat. This is possible, but at present there is no recorded instance of M by itself, standing for Mithras. He is generally addressed as *Deo Soli invicto*; or *DSIM*, that is, *Deo Soli invicto Mithræ*, or *Mithræ C(auto) P(ati)*, and it would not be easy for the sculptor to find room for all these letters in the right-hand corner; nor does the figure in any way resemble the representations of Mithras. Another reading is *Deo Magno Volcano Irenæus et Arimanius posuerunt*. Against this there is the fact that Vulcan never appears under the form of *Vol*. Besides, he is never represented with wings, and the hammer and tongs are more congenial to him than the staff and keys.

We now come to Professor Hübner's own suggestion. Leaving for a moment the name of the deity, he reads the words within the label or inclosed space, as follows:—VOLVSI IRENÆVS ET ARIMANVS POSVERVNT, that is, he makes the dedicators two brothers, called respectively *Volusius Irenæus* and *Volusius Arimanius*. The name Arimanius is peculiar; it is possible that the *Volusii* were of Persian descent, and familiar therefore with the Eastern deity Arimahn.

We now turn to the headless mysterious divinity. Dr. Hübner considers that we have in it a representation of Time—Æon or Ævum—and he compares it with a number of similar figures, discovered abroad, which are thought to set forth the same deity. The characteristics of these figures are a naked form with a lion's head, and a serpent coiling round the body. Sometimes it has two wings on the shoulders, sometimes two more on the legs. It holds a staff in one hand, often resembling a measuring rod; in the other hand there is a bunch of keys. All these points are symbolical of Eastern worship, and some of them have been introduced into Christianity. The snake represents the mingling ages or eternity; the rod, the power to take the measure of time; the keys, the opening and closing of all things, particularly of the year; the lion's head signifies the strength and the devouring power of time.

To turn to the sculpture itself, which is standing beside you, Dr. Hübner considers that it had a lion's head, and that the belt around the waist is an unsuccessful effort of a provincial sculptor to represent a serpent. In the right hand, or near it, is a portion of the measuring rod, in the left are the keys. The figure has two wings, and Dr. Hübner supposes that in the right hand corner, at the end of the label, was the word *Ævo* or something like it. At the head of his paper, by the side of our figure from York, he gives a lithograph of a stone in the museum at Bonn, which does little more than express the very part which the York sculpture wants, I mean the lion's head. A more hideous looking creature it is difficult to imagine.

In the course of the present summer a fragment of a tablet of limestone was discovered on the Mount, but most

unfortunately, only six letters of the inscription have been preserved. They constitute the ends of the two last lines

C V R
O.S.P.

Of course any reading of this fragment can only be of the most conjectural character. The last two letters probably stand for *sua pecunia*. It is much to be hoped that some farther portions of this inscription may be discovered.

There have been recently placed in the Museum two silver rings, each of which bears an inscription. The first was found some two years ago upon Barker Hill, and when it was cleaned with acid the two words DEO SUCELO disclosed themselves. The god Suceus is entirely unknown. Probably he was some local divinity. There was a place of a similar name in Spain, and it is easy of course to form a theory that some soldier of the 9th, or the Spanish legion, brought this ring with him to York.

The other ring bears the letters TOT, which are still more difficult to explain. It was found on the new railway works. Dr. Hübner suggests the possibility of Mars *Toutates* having been intended. But this is entirely conjectural, and so also is the idea that TOT represents *totus*, to be rendered perhaps *wholly thine*, so that we may regard the ring as a lover's gift.

We have a discovery of a very different character in a stone coffin which was found in the new Railway Station in the month of June. It bears no inscription, but it is the longest and the heaviest that we possess, being eight feet in length and proportionately thick. The coffin contained the bones of a woman laid in gypsum, in close adherence to which were portions of the dress in which she had been interred. The best of these fragments have been carefully preserved (they were shown upon the table), and the coffin is now placed in the row of Roman tombs in the Hospitium, the bones and the gypsum having been carefully replaced in their original positions. The top of the coffin is secured by a glass frame. And now let me mention a curious circumstance. The holes in the stone by which the frame is fastened to the coffin, were drilled by a left-handed man, and he remarked that the tool marks

on the outside of the coffin showed that the Roman mason who made them with his chisel had been left-handed like himself. The stone is so fine, and the chisel marks upon it are so fresh, that the coffin might have left the mason's yard last week, instead of sixteen hundred years ago.

Yorkshire Philosophical Society.

ANNUAL REPORT

FOR

MDCCCLXXVIII.

A N N U A L R E P O R T

OF THE COUNCIL

OF THE

Y O R K S H I R E

PHILOSOPHICAL SOCIETY

FOR

MDCCCLXXVIII.

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 4TH, 1879.

Y O R K :

J. SOTHERAN, BOOKSELLER, CONEY STREET.

1 8 7 9 .

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OF THE

Yorkshire Philosophical Society.

HER MAJESTY THE QUEEN.

H. R. H. THE PRINCESS OF WALES.

PATRONS.

H. R. H. THE PRINCE OF WALES.

H. R. H. THE DUKE OF CONNAUGHT.

HIS GRACE THE ARCHBISHOP OF YORK.

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WILLIAM REED, F. G. S.

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<i>consisting of</i>	T. S. NOBLE, F. R. A. S., F. G. S.

KEEPER OF THE MUSEUM :

J. C. PURVES, M. D.

REPORT OF THE COUNCIL

OF THE

YORKSHIRE PHILOSOPHICAL SOCIETY,

FEBRUARY 4TH, 1878.

The Council in presenting their report of the Society's affairs for the year 1878, have much pleasure in congratulating the Members on its continued usefulness and prosperity.

The actual income for the past year has been one of the largest ever recorded in the annals of the Society, and although the expenditure has been exceptional in respect of the various sums spent in improvements and in extending the space in the Museum for the recently acquired Geological collection, as well as in the purchase of Antiquities, yet when the facts are more particularly stated, as will appear in this Report, the members will at once perceive that the debit side of the Treasurer's balance sheet discloses an expenditure absolutely necessary for the welfare of the Society.

The total income for the past year amounts to £1450 6s. 3d.

The two principal sources of income are the subscriptions and the money received at the Gate. The former has amounted to £991 1s. 0d., being a higher sum than has ever been received from this source in any previous year; whilst the admission money received from strangers at the Gate has amounted to £312 7s. 9d., the largest amount with one exception in the experience of the Society.

On the debit side of the Treasurer's account it will be found that £104 12s. 7d. has been expended in the purchase of Roman and Saxon Antiquities, chiefly discovered in the various excavations which are being made in York and its neighbourhood.

The arrangements in respect of the Geological collection presented by William Reed, Esq., have cost the Society £264 19s. 5d. The presentation of this extensive and valuable series rendered it a work of absolute necessity to alter and re-arrange the whole of the Society's collections in the large Geological room and the Foreign Bird room.

A further sum of £263 11s. 10d. has been expended in the enclosure and laying out of the additional ground adjacent to Marygate, and now forming part of the grounds of the Society.

This work has been carried out with great care and skill under the direct superintendence of your honoured Vice-President, William Henry Rudston Read, Esq., to whom the Society is so largely indebted for many valuable donations and for the kind interest he continues to take in the success of the Society which he has done so much to promote.

The other items of expenditure are of so ordinary a character as to require no special notice, but will be found detailed in the Treasurer's balance sheet.

The Council will now follow the usual custom, and notice in detail the various scientific departments of the Institution.

Department of Antiquities.—The past year has witnessed considerable improvement in the Antiquarian departments, and large additions have been made to the Collections which the Society already possessed.

The chief event in the year has been the completion and opening of the Ethnological and Pre-historic room in the upper part of the Museum Buildings. The work of re-arrangement has been going on for some time, and has necessitated very great labour and considerable expense. The members will now be able to see for the first time many interesting objects which have been hitherto concealed in drawers for want of space. The Saxon, Danish and Pre-historic antiquities in this room are under the charge of Mr. Greenwell, who has kindly added very considerably to their number. An ancient Saxon burial ground has also been discovered in the vicinity of York, in which the ashes of the dead, who had been burnt on the funeral pile, were deposited in urns. Many of these urns, which were in a state

of great decay, have been acquired and have been carefully repaired, and will be exhibited in the new room in the course of the present year. It will be necessary also to remove to the same place, before long, some of the objects that are at present in the Hospitium, which has become inconveniently crowded, and for these, fresh cases will be required.

The progress of the Roman and more recent collections in the Hospitium during the past year has been most marked, and this is owing to the purchase by the Society, of two private collections, which had been formed in York during the recent excavations on the Railway. Many beautiful ornaments, especially of jet, have been acquired, which make our Collection of wrought jet by far the finest that is known. The same opinion may be passed on our collection of Roman Antiquities, as a whole. No single City or Camp in Britain has yielded so large a number of curious and valuable objects, and it is earnestly to be hoped that in coming years no trouble or expense, within reasonable bounds, will be spared to make our Roman Museum a still more adequate representation of ancient Eburacum and its inhabitants. There are still one or two other collections in this City, which the Society, when it has the opportunity, should do its best to acquire. A few fragments of a fine inscription were discovered in the summer of last year, in the front of the new Station Hotel, but they are too mutilated to be fitted together or interpreted. The excavations on the site of the Exhibition buildings have yielded much less than was expected. The object of greatest interest that has been found there, is a fine aureus of Vespasian in excellent condition.

There is, however, no portion of the Antiquarian Departments that has not received during the past year many valuable additions.

Geological Department.—In the Geological Department, as already intimated, the Council have formally to announce the presentation to the Society of the valuable Geological collection of their respected Vice-President, William Reed, Esq., F. G. S.

The collection presented by Mr. Reed, has been formed at a great cost over a period of many years, and has been well

known to Geologists as one of the most valuable private collections in the United Kingdom.

The Council congratulate the Society on its acquisition of a collection, which, when displayed in the Society's rooms, will raise our Museum to the first rank among similar scientific Institutions in this country. The arrangement of the collection will be a work of some time, and is now being actively and systematically carried out, under the personal superintendence of Mr. Reed, by Dr. Purves, the recently appointed Keeper of the Museum.

The Collection presented by Mr. Reed consists of:—

1. A complete series of shells of the Land, Fresh-water and Marine Mollusca of Great Britain, comprising many fine specimens of the rarer species and several of those forms first ascertained to be still living members of the British Fauna during the dredging expedition of the "Lightning" and "Porcupine."

2. An extensive collection of Mammalian remains from English Post-Tertiary deposits, remarkable among which, for their fine state of preservation, are the teeth and bones of Rhinoceros, Horse, Hippopotamus, Urus, Megaceros, Elephant, Bear, Lion, Hyæna, Beaver, &c.

3. A large series of shells of the same period from Fluvial and Marine deposits in various parts of England, Scotland and Ireland.

4. A magnificent collection of Fossils from the Norwich, Red and Coralline Crag. The suite of Vertebrate remains, especially, is of great value. This is probably the finest private collection of Crag fossils in England, and it is doubtful whether it can be equalled in any of our great public Museums.

5. A series of Plant remains from the Miocene beds of Bovey Tracy and Antrim, which, with similar lacustrine deposits in Mull, are the only formations of Mid-Tertiary age in the British Isles. The animal life of the period is illustrated by collections of Shells from Touraine, the neighbourhood of Bordeaux, and the Basin of Vienna.

6. A large collection of Eocene fossils in a beautiful state of preservation, and in which the several subdivisions of the deposits of that period in England are fully represented.

7. An extensive assemblage of fossils from the Chalk, Greensand, Gault, Neocomian and Wealden. Many of the silicified forms are shown in beautifully polished sections.

8. A very large and valuable series of Jurassic forms.

9. All the British Palæozoic formations are well represented, especially the Carboniferous Limestone of Yorkshire, in the neighbourhood of Settle, of the fossils in which there is a fine collection (upwards of 200 species).

An invaluable feature, from a scientific point of view, in Mr. Reed's collection, is the great care which has been taken to indicate the exact locality from which the several specimens have been obtained, so that thorough reliance may be placed in them as geological data.

In a review of this Department, it is of interest to refer to a statement published by the Society, on its foundation upwards of 50 years ago.

"The more particular object of the Society is, to elucidate the Geology of Yorkshire. There are few counties in England which are traversed by so great a variety of Strata as this, few of which the Strata contain so many Fossils interesting to the Geologist, or so many minerals important to the Arts, and few of which the Geological relations are so imperfectly and doubtfully determined. Towards the illustration of this subject, the Society hope that much may be done by the combined observation of many individuals in the respective neighbourhoods, and by a contribution of Specimens from every part of Yorkshire to a Central Museum."

How faithfully the object referred to has been kept in view, and promoted by those who have had the direction of the Society's affairs in years past, the labours of Professor Phillips, the Reverend W. V. Harcourt, and others, abundantly prove, and in the possession of this magnificent collection the Society can now offer to Students of Geology most valuable help in the study of this interesting and valuable department of Science.

British Ornithology.—The Curator of British Ornithology has to report the purchase of the Great White Heron, *Ardea Alba*, at the sale of James Hall, Esquire, for the Museum.

This specimen was killed at Scarborough, near Beverley, 1834, and is mentioned in Yarrell and Gould: also the addition of a specimen of the Great Snipe, *Scolopax Major*, shot at Hayton, September 24, 1878, and a variety of the common Starling, presented by Alderman Melrose, shot at Clifton Croft.

He has also to record a curious pied variety of the Peewit, shot at Whitley Bridge on the Pontefract and Goole Railway, by Major Eadon; its appearance was so varied and singular that he wrote to the Major about it, who kindly replied by stating that if he ever parted with it, the Museum should possess it. Sea Mews, Goosanders, and Wild Swans have visited this neighbourhood during the severe storm this Winter.

Botany.—The Curator of Botany reports that the British and Foreign Herbaria are in a good state of preservation.

There have been no additions to this department during the past year.

Department of Comparative Anatomy.—The Curator of Comparative Anatomy reports that the Irish Elk was re-articulated and set up in the new Ethnological room, in close proximity to the Flint Implements and other works of pre-historic man with whom it is supposed to have been contemporary. It was placed on a platform well adapted for its display and as high as the room would admit, but it was found not to be sufficiently elevated to be free from handling by visitors and consequent risk of injury designed or unintentional. It has been remounted in the centre of the foreign bird room, the platform being raised on the top of a new stand which is arranged to hold bones, and other specimens required for reference but not of sufficient general interest to displace other objects now exhibited in the wall cases.

The work of re-arrangement, which is urgently required, has not been carried out in consequence of want of funds. It is hoped that these may be shortly forthcoming so that other valuable specimens not exhibited at present may be incorporated with the collection before the Meeting of the British Association.

Mr. Wakefield reports that the chief meteorological features of the past year were the prevalence of uniform barometrical pressure, the mildness of the first four months, the entire absence of frost in May, the genial weather of July, the wetness of August, the heavy snow storms of November, and the severe cold of the same month which also prevailed during the whole of December.

The mean height of the mercurial column, corrected to 32° F. and mean sea level, was 29·8941 inches; the highest reading was 30·679 inches on March 16th, and the lowest 29·032 inches on April 1st, giving a range of pressure of 1·647 against that of 1877 of 2·022 inch.

The mean temperature for the year was 48·10 or 0·5 of a degree above a mean of fifty years. The first five months each showed an excess over the average. June alone out of the first ten fell below its normal warmth. January, February, July and October, were 3·21, 3·55, 3·44 and 2·36 degrees above the respective means. Seven times the thermometer exceeded 80 degrees, viz., on June 26th, 27th, and July 17th, 18th, 19th, 20th, 21st; and the hottest whole days were June 26th and July 19th, with a mean temperature of 74·5 and 72·5 degrees respectively. The coldest mean day temperature was on December 14th, with 19·5 degrees. The difference between the highest point reached in the year and the lowest, amounted to 77 degrees, while in 1877 the range was 5·7 degrees between the extremes; and the difference between the warmest whole day and the coldest was 55 degrees. There were 85 frosty nights in the year, viz., in January 10, February 10, March 14, April 6, October 1, November 14, and December 30. The mean temperature of December was 30·01 degrees or 8·69 degrees below the average of 50 years. Every day except the last four was below the mean. The mean daily temperature of the fifteen coldest days consecutively was 25·1 degrees, while that of the same number of days, though not consecutive, in 1874 was 26·4 degrees. The lowest reading of the thermometer was 11 degrees on the 24th as against 5 degrees on the 29th of the same month in 1874, and 4 degrees on 24th December, 1860. The following table exhibits the months of excess and defect of temperature.

Excess.		Defect.	
January	3·21	June	·35
February	3·55	November	3·93
March	1·66	December	8·69
April	1·21		<u>12·97</u>
May	·36		
July	3·44		
August	1·77		
September	1·41		
October	2·36		
	<u>18·97</u>		
	12·97		
	<u>12)6·00</u>		
Excess for the whole year	·50		

The rainfall for the year, including melted snow, amounted to 28·72 inches or 4·735 inches above the average of fifty years, in great part arising from the exceptionally wet August in which no less than 5·07 inches of rain were registered.

The greatest rainfall, in twenty four hours, for the year was on August 13th, when 1·26 inches of rain were measured.

Excess.		Defect.	
January	·320	February	·580
May	1·951	March	·603
June	·758	April	·264
August	2·357	July	·759
September	·348	October	·474
November	1·977	December	·296
	<u>7·711</u>		<u>2·976</u>
	2·976		
	<u>4·735</u>		
Excess for the whole year	4·735		

The River Ouse rose above its summer level on January 23rd 10 ft. 8 in.; June 12th, 9 ft.; November 17th, 12 ft. 3 in.; and December 31st, 12 ft. 10 inches.

Comparative prevalence of winds; from N. to E. on 97 days, E. to S. on 41 days, S. to W. on 114 days, W. to N. on 113 days.

METEOROLOGICAL REGISTER, YORK, 1878.

BAROMETER.				RAIN.		THERMOMETER.					
Month.	Highest.	Lowest.	Mean.	Inches.	Days.	Average Maximum.	Average Minimum.	Mean Temp.	Highest.	Lowest.	
Jan.	30·605	29·374	30·0853	2·02	21	44·94	34·06	39·50	56	24	
Feb.	30·580	29·788	30·2330	·89	11	47·46	35·21	41·34	59	24	
Mar.	30·679	29·373	30·0365	·99	13	49·39	34·52	41·95	59	19	
April	30·247	29·032	29·8595	1·24	10	55·57	38·23	46·90	65	28	
May	30·166	29·260	29·7503	3·64	20	59·87	45·23	52·55	69	33	
June	30·198	29·375	29·9379	3·10	13	66·13	49·37	57·75	88	40	
July	30·393	29·657	30·0246	1·67	10	70·52	53·55	62·03	85	41	
Aug.	30·384	29·211	29·7407	5·07	22	69·35	52·77	61·06	75	45	
Sept.	30·267	29·417	29·9055	2·56	15	63·47	48·53	56·00	72	37	
Oct.	30·318	29·055	29·7152	1·95	17	57·03	43·87	50·45	67	29	
Nov.	30·465	29·185	29·7566	4·05	23	42·77	32·57	37·67	50	26	
Dec.	30·320	29·047	29·6845	1·54	17	35·77	24·26	30·01	50	11	
	30·679	29·032	29·8941	28·72	192			48·10	88	11	

RAINFALL, 1878.

Month.	Total Depth.	Greatest Fall in 24 Hours.		Days on which 01. or more fell.	Malton.	Langton.
		Depth.	Date.		Inches.	Inches.
Jan.	2·02	·50	27	21	2·22	2·09
Feb.	·89	·44	14	11	0·95	1·52
Mar.	·99	·23	9	13	0·84	1·06
April	1·24	·50	20	10	1·80	1·78
May	3·64	·50	23	20	4·19	3·44
June	3·10	·70	9	13	3·24	2·89
July	1·67	·58	28	10	0·72	0·55
Aug.	5·07	1·26	13	22	7·00	5·79
Sept.	2·56	·44	25	15	1·53	1·60
Oct.	1·95	·43	21	17	2·02	1·99
Nov.	4·05	·59	15	23	4·20	4·60
Dec.	1·54	·38	25	17	1·90	2·21
	28·72			192	30·61	29·52

COMPARATIVE PREVALENCE OF WINDS.

N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.
70	4	15	8	19	8	6	8
S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.
61	9	30	14	60	13	24	16

The following observations made at Langton, Malton, have been kindly supplied by the Rev. A. Shadwell, M. A.

Mean of Barometer corrected, 30·04 inch. Rainfall 2·310 inches over average of 25 years. Very dry July, exceedingly wet August, only surpassed by 1857 with 6·435 inches. Highest flood on record on November 18, 14 ft. 7 in. above summer level.

Mean temperature 0°·36 below average.

January, 3°·20, February, 3°·54, July, 2°·42, in excess.

June, 2°·90, November, 4°·40, December, 12°, in deficiency.

Highest in shade, July 18, 82°·5.

Lowest in shade, December 25, 3°.

It will be in the remembrance of many of the Members of the Society that in the year 1867, Mr. Dallas resigned the Office of Keeper of the Museum, on his appointment as Secretary to the Geological Society. Since that date the office has remained vacant.

For the reasons stated in the report of 1870, the Council did not think it advisable to fill up the appointment. In that year Mr. Baines, who for upwards of 40 years had discharged the duties of Sub-Curator of the Museum and Grounds, from old age and increasing infirmity, placed his resignation in the hands of the Council. The Council allowed him to retire on a pension of £100 a year with the use of the Sub-Curator's residence house for life. The Council also at the same time granted to James Davison, one of the gardeners, who had been in the Society's employ for a similar period, a pension of £25 a year, and with these heavy charges on the Society's income, the Council did not feel justified in electing to the vacant office of Keeper of the Museum. The Council, however, retained the

services of Mr. Charles Wakefield as an assistant in the Scientific and other work of the Museum during the vacancy, an office which he had previously filled on the resignation of a previous Keeper of the Museum until the appointment of Mr. Dallas. On the 15th of May Mr. Baines died, at the ripe old age of 84, having been for several years past in feeble health. It would be unjust to the memory of this valued Officer of the Society to close this Report without a brief record of his services, extending over a period of many years. Mr. Baines first entered the service of the Society as Sub-Curator in the autumn of 1829. The report for the year 1830 contains this paragraph on the appointment of Mr. Baines. "The Council consider themselves fortunate in the person whom they have engaged to take charge of the grounds under the Curator, a person qualified by his skill and industry not only to cultivate the garden with scientific diligence, but to render essential service to the Museum. His activity has already obtained for the Society 500 plants." How the hopes raised on his appointment were fulfilled by the labours of a long life is best evidenced by the state of the Museum and grounds during the period of his curatorship.

Mr. Baines had not only a fair knowledge of Natural History, Antiquities and Geology, but he was a Botanist of high repute, and his work on "Flora of Yorkshire" will long remain an evidence of his attainments in this department of Science.

The Council, after the decease of Mr. Baines, thought the time had arrived when an appointment ought to be made to the Office of Keeper of the Museum, and they have selected for this office, out of many candidates, J. C. Purves, Esq., M. D., of Edinburgh, lately engaged on the Geological Survey of Scotland, who produced testimonials of the highest class. The Council have decided to sever the management of the Society's finances from the other business which devolves upon the Keeper of the Museum, and your respected Treasurer has kindly consented to allow one of his principal Clerks to take charge of this department under his own superintendence. Dr. Purves, therefore, after attending in the first place to the general wants and interests of the Museum, will be able to

c

devote more time than any previous Keeper to the scientific work, particularly to the re-arrangement of the Geological Department.

The following Lectures have been delivered in the Theatre of the Museum during the past year.

SUBJECT.	NAME OF LECTURER.
Ralph Thoresby, of Leeds, and his Museum	} REV. CANON RAINE.
The Great Pyramid	
A Visit to the East in 1876	R. A. PROCTOR, B. A., F. R. A. S.
The Greeks	REV. F. LAWRENCE, B. A.
Weather Lore	J. W. BARRY, Esq., B. A., Oxon.
The Sequence of Climatic fluctu- ations and on permanent cli- matic changes in the British Islands	REV. A. SHADWELL, M. A.

During the present session the lectures have been discontinued. The great labours entailed in re-arranging many departments of the Museum have prevented your honorary officers from devoting further time for the delivering of lectures, whilst the many claims upon the income of the Society have compelled your Council to decline the usual grants to scientific experts, for lectures in the York Museum.

The following Members of Council retire by rotation, and are ineligible for re-election during the present year: W. Matterson, Esq., M. D., The Rev. George Rowe, Tempest Anderson, Esq., M. D., and Joseph Wilkinson, Esq.

The Council recommend for election: W. C. Anderson, Esq., W. Atkinson, Esq., The Rev. T. B. B. Ferris, The Rev. G. H. Hewison.

They recommend also the following additions to the list of Honorary Members: Professor Oswald Heer, of the University of Zurich, F. G. S., Lond., author of the *Primæval World of Switzerland*. Professor Heer is specially distinguished for the knowledge which he possesses of Fossil Botany, having described the Plant remains from the Miocene beds of Bovey

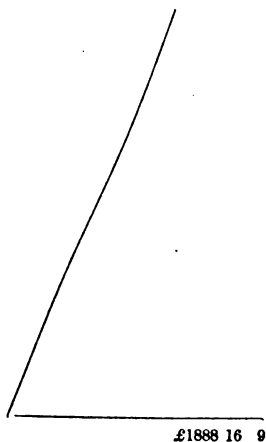
Tracy, and also the Plants from the Polar Regions obtained by the British Arctic Expeditions. Professor Paul Gervais, Member of the Institute of France, Professor of Comparative Anatomy in the Museum of Natural History, Paris, F.G.S., Lond.; Professor Gervais is one of the most distinguished of Continental Palæontologists and is specially known by his writings on the Fossil Vertebrata.

THE TREASURER IN ACCOUNT WITH
THE YORKSHIRE PHILOSOPHICAL SOCIETY
FOR THE YEAR 1878.

Dr.	INCOME.			
1878.	£.	s.	d.	£. s. d.
<i>Annual Subscriptions, &c.:</i>				
Members	715	0	0	
Lady Subscribers	78	1	0	
Associates.....	16	0	0	
Arrears	10	0	0	
				819 1 0

<i>Admission Fees of New Members:</i>				
Paid in Full	27	0	0	
Paid by Instalments	65	0	0	
				92 0 0
Composition in lieu of Subscriptions	25	0	0	
Keys of the Gates.....	52	0	0	
Temporary Subscribers	3	0	0	

<i>Rents:</i>				
New Manor Shore Property	19	18	3	
St. Mary's Lodge	54	6	3	
Swimming Bath.....	40	0	0	
Boat Yard	5	0	0	
Water Works Co.	0	1	0	
				119 5 6
Gate Money	312	7	9	
Sale of Guide to Antiquities, &c.....	12	16	3	
Use of Tent.....	13	15	9	
Sale of Duplicate Antiquarian Specimens	1	0	0	
				1450 6 3
Excess of Expenditure, 31st Dec., 1878.....	438	10	6	



£1888 16 9

Permanent Debt:

Yorkshire Insurance Company	1900	0	0
Due to Two Members, £50 each	100	0	0
			2000 0 0
Balance due to Treasurer, 31st Dec., 1877	418	10	6
Excess of Expenditure for 1878	438	10	6
			857 1 0
			£2857 1 0

Cr.	EXPENDITURE.			
1878.	£.	s.	d.	£. s. d.
Crown Rent	1	0	0	
Corporation Rent	19	11	8	
Water Rent	10	9	0	
Rates and Taxes.....	14	2	11	
Insurance.....	5	11	6	
				50 15 1

<i>Salaries and Wages:</i>				
C. Wakefield	140	0	0	
H. Baines (Pension)....	29	17	10	
J. Davison (Do.)	28	0	0	
J. Fielden	70	4	0	
Lodge Keeper	37	4	0	
Attendant, Museum	46	16	0	
Do., Hospitium	16	18	0	
Gardeners	182	2	0	
				546 1 10
Interest to Insurance Company	74	11	8	
Interest and Commission to Bankers	26	15	4	

<i>General Expenses and Repairs:</i>				
Museum	85	18	2	
Estate	29	19	10	
St. Mary's Lodge	24	12	2	
Colouring Walls of Museum, &c.	28	13	3	
Entrance Lodge	18	4	4	
Entrance Hall Painting	6	14	6	
Antiquities fixing in do.	16	12	2	
Ethnological Room	77	7	9	
Foreign Bird Room	11	5	0	
Alterations in Geological Room, &c.	198	2	9	
Dr. Purves arranging Specimens in do.	55	11	8	
Mounting of Irish Elk..	18	9	4	
				571 10 11

<i>Gardens, Greenhouses, &c.:</i>				
General Expenses and Repairs	31	10	3	
Seeds, &c.....	5	1	3	
Coals and Coke	9	15	8	
Inclosure of New Grounds	263	11	10	
				379 19 0
Purchase & Preparation of Specimens	19	16	2	
Library: Books and Binding	38	14	8	

<i>Miscellaneous Expenses:</i>				
Printing of Report and Communications	14	10	0	
Printing, Stationery, &c.	8	18	3	
Coals and Gas	41	18	2	
Expenses of Lectures..	30	4	7	
Do. Bands	29	10	6	
Do. Roman Antiquities, &c.	104	12	7	
Subscription to Templeboro' Fund	20	0	0	
Postages and Bridge....	0	18	0	
				250 12 1
				£1888 16 9

Permanent Debt:

Yorkshire Insurance Company	1900	0	0
Due to Two Members, £50 each	100	0	0
			2000 0 0
Balance due to Treasurer, 31st Dec., 1878.....	857	1	0
			£2857 1 0

Audited and found correct, 23rd January, 1879,
F. L. MAWDESLEY.

W. GRAY,
Treasurer.

MEMBERS ELECTED IN 1878.

Stewart, Mrs., 2, *St. Peter's Terrace, Clifton*.
 Mountain, J. W., *Goodramgate*.
 Lambert, T. M., *Parliament Street*.
 Brown, James, 19, *Feasegate*.
 Swales, John, *Goodramgate*.
 White, W. A., *Clifton*.
 Ainsley, Robert, 20, *Pavement*.
 Dennison, William, *Marygate*.
 Hardcastle, John, 19, *Coney Street*.
 Sotheran, John, *Coney Street*.
 Masterman, William, *Parliament Street*.
 Smith, E. J., 38, *Mount*.
 Hunter, Thomas, 21, *Portland Street*.
 Thompson, Edward Percy, *Sheriff Hutton Park*.
 Swaine, Mrs., *St. Leonard's Place*.
 Paterson, Miss, *Lord Mayor's Walk*.
 Kendall, E. B., 30, *Pavement*.
 Varey, W., *Lord Mayor of York*.
 Inchbald, Miss, *Bootham House*.
 Foster, L., Junior, 3, *Tower Street*.
 Fitzsimons, H., M. D., *Minster Yard*.
 Kitchingman, Philip, 10, *Museum Street*.
 Fox, M. R., 12, *Parliament Street*.
 Dove, R., *Blake Street*.
 Lowe, A. T., *North Eastern Hotel*.
 Hines, C. H., Junior, *St. Saviour's Place*.
 Faiers, William, *Museum Street*.
 Bellerby, John, *Holly Croft*.

LADY SUBSCRIBERS, 1878.

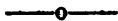
Horsley, Miss, *The Mount*.
 Radcliffe, Mrs. Mary Anne, *De Grey Street*.
 Stephens, Mrs., 27, *De Grey Street*.
 Sutton, Mrs. George, 61a, *Gillygate*.
 Sotheran, Mrs., *Clifton*.
 Jakell, Mrs., *The Mount*.

ASSOCIATE.

Stephenson, Marshall, *Museum Street*.

RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEBRUARY 4TH, 1879.



1. That the Report of the Council now read be adopted and printed for circulation amongst the Members, Lady Subscribers, and Associates of the Society.

2. That the thanks of the Society be given to the Members of Council retiring from office, also to the Treasurer, Secretary, and Curators for their valuable services; and that authority be given to the Council to give admission to the Public to the Museum on Whit-Monday and Tuesday, under the same regulations as last year.

3. That the thanks of the Annual Meeting of the Yorkshire Philosophical Society be given to William Reed, F. G. S., for the donation of his valuable Collections in Geology to be added to those in the Museum of the Society.

4. That the thanks of the Meeting be given to the Chairman.

DONATIONS TO THE MUSEUM.

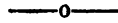
GEOLOGY AND MINERALOGY.

- Crompton, Miss Henrietta A Collection of Quartz crystals and polished pebbles.
- Norcliffe, Rev. C. B. Aerolite which fell in 1868 in the Forest of Chinon.
 17 Fossils from Vals (France).
 9 do. Chinon (do.)
 9 do. Prissac (do.)
 3 do. Lisbon.
- Raine, Rev. Canon 2 Fossils from Marske.
 Specimen of Amber.
- Reed, Mr. W. Cast of Rostrum of *Ziphius medilineatus*. Red Crag, Woodbridge.
 Cast of the Cranium of *Halitherium Canhami*, *Flower*. Red Crag, Foxall.
 Cast of basal portion of skull of *Trichecodon Huxleyi*. Red Crag, Suffolk.
 Cast of stem with leaf-scars and fruits of *Mantellia inclusa*, *Carruthers*.
- Walker, Mr. J. F. 8 species of Yorkshire Permian Fossils.

ZOOLOGY.

- Club, Yorkshire Naturalists' *Carabus nitens*, taken on Strensall Common.
- Crompton, Miss Coral (*Madrepora corymbosa*).

Hind, Mr. R.	9 specimens of <i>Nepticula subbimaculella</i> .
	3 do. <i>Coleophora genisticolella</i> .
Kröhn, Mrs.	Skull of Wild Boar.
	Skull of Kaffir.
Raine, Rev. Canon	Specimen of a Beetle (<i>Monochamus dentator</i>), found at the Railway Works.
Read, Mr. W. H. Rudston	Two very fine specimens of the Great Snipe (<i>Scolopax major</i>) shot at Hayton.
Walker, Mr. J. F.	Viper (<i>Vipera berus</i>); a Remora; Flying Fish; Centipedes, Lizards, &c.
	Specimen of Great Bat.
	Do. Long-eared Bat.



ANTIQUITIES.

Edston, Mr. G.	A Roman Vase.
Leak, Mr., <i>Walmgate</i>	Silver Penny of Edward II.; Do. of Edward VI., struck at York.
	Calendar in bronze, 1777.
Norcliffe, Rev. C. B.	A number of Egyptian Antiquities.
Nankivell, Mr. J. H.	4 Brass Coins; 1 Silver do.; Chinese Gold Coin; 3 do. Silver do.
	2 Photographs of the recent Roman excavations at Lincoln.
Newton, Mr., <i>Tower Street</i>	Silver Penny of Edward the Confessor, struck at York.
Raine, Rev. Canon	Silver Coins struck at York; Penny of Ethelred; Do. of Richard II.; Do. of Henry I.; 3 Pennies of Henry III.; 2 do. of Edward I.; 6 Groats and Half-Groats of Edward I. and III.; 3 Half-Groats of Henry VI.; 2 Pennies of Edward IV.; 3 Half-Groats and a Penny of Henry VII. and VIII.
Reed, Mr. W.	Key found on Scarbro' Castle Hill.

- Robinson, Mr. T. W. 2 Pennies of Edward I., struck at York.
- Rookledge, Mr. W. Part of burnt boss and moulded rib from York Minster old ceiling; Board from do.; Carved Rose of York; parts of Beams of Belfrey and Castlegate Churches; Altar-rails from St. Maurice and Castlegate Churches; Stall end from South Kilvington, and do. from Swillington; Moulded piece from St. Maurice; 2 pieces of Oak Cornice; specimen of Brass work.
- Smithson, Mr. E. W. Glass Bottles from Baiæ.
- Strehpens, Rev. T. Mediæval Pot, found in Goodramgate.
- Valentine, Mr. A., *Whixley* Carnelian Ring-stone, conqueror tearing a captive away from an altar, found in Blossom Street.

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LIBRARY.

- Academy, The Atti della R. Accademia dei Lincei for 1878.
- Association, Geologists' .. Proceedings, vol. v., Nos. 3, 4.
- Astronomer Royal Astronomical Observations made at the Royal Observatory, Edinburgh, 1870—77, vol. xiv.
- Author, The Remarks on Shakespeare, his birth-place, &c., by C. Roach Smith.
- Author, The Historia Filicum, by J. Smith, A.L.S.
- Author, The On the Geology of Leicestershire, and Report of the Excursion of the Geologists' Association, by W. J. Harrison.
- Author, The Geology of the West Riding of Yorkshire, by W. J. Harrison.
- Author, The On the Chalk of Yorkshire, by Rev. J. F. Blake, M.A.

D

- Club, Tyneside Naturalists' Natural History Transactions of North-
umberland and Durham, vol. vii.,
pt. 1.
- Club, Dorset Natural His- }
tory and Antiquarian } Proceedings, 1877.
Field }
- Hudleston, Mr. W. H. .. Descriptive Catalogue of the Minerals
and Fossil Organic Remains of
Scarborough and the vicinity.
- India, Geological Survey of Palæontologia Indica, ser. ii. 3., ser.
iv. 2, ser. x. 3, and ser. xi. 2.
Records of Geological Survey of India,
vol. x., pts. 3, 4.
- Indian Government..... The Meteorology of the Bombay
Presidency, 2 vols.
- Institution, Royal, of Great }
Britain } Proceedings, vol. viii., pts. 3, 4.
- Institution, Smithsonian.. Report for 1876.
- Institution, Hull Royal .. Report for 1877—78.
- Kenrick, Mrs. Numismatique de la Terre Sainte, par
F. de Sauley.
- Mayer, Mr. Joseph Catalogue of the Mayer Collection,
pt. 1. The Egyptian Antiquities.
The Mayer Collection in the Liverpool
Museum, considered as an educa-
tional possession, by C. J. Gatty.
- Publishers, The Nature for 1878.
- Read, Mr. W. H. Rudston Journal of the Linnean Society:
Zoology, Nos. 72—76.
Botany, Nos. 93—99.
- Raine, Rev. Canon Reports of the Whitby Philosophical
Society, 2 vols.
- Society, Chemical Journal for 1878.
- Society, Hull Literary and }
Philosophical } Report for 1877—78.
- Society, Leeds Literary and }
Philosophical } Report for 1877—78.
- Society, Leicester Literary }
and Philosophical } Report for 1877.
- Society, Meteorological .. Quarterly Weather Report, pt. 3, 1875.
Meteorology of the North Atlantic,
during August, 1873, 2 vols.

- Society, Warwickshire }
 Natural History and } Report for 1877.
 Archæological }
- Society, Zoological Transactions, vol. x., pts. 3—5.
- Society, Edinburgh Royal }
 Transactions, vol. xxviii., pt. 1.
 Proceedings, Session 1876—77.
- Society, Geological Quarterly Journal for 1878.
- Society, The Historic, of }
 Lancashire and Cheshire } Transactions, 3rd ser., vol. vi.
- Trustees, The 11th Annual Report of the Peabody
 Museum of American Archæology
 and Ethnology.

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SERIAL WORKS SUBSCRIBED FOR.

- Birds of Asia, by John Gould, F. R. S.
- Natural History of the Tineina, by H. T. Stainton, F. R. S.
- Nautical Almanack.
- Proceedings of the Zoological Society.
- Publications of the Palæontographical Society.
- Publications of the Ray Society.
- Sowerby's Thesaurus Conchyliorum.
- London, Edinburgh, and Dublin Philosophical Magazine.
- Annals and Magazine of Natural History.
- Geological Magazine.
- Journal of the British Archæological Association.
- Numismatic Chronicle.
- Memoires de la Société Paléontologique Suisse.
- D'Orbigny's Paléontologie Française.
- Geological Record for 1875.

Porkshire Philosophical Society.

ANNUAL REPORT

FOR

MDCCCLXXIX.

ANNUAL REPORT
OF THE COUNCIL
OF THE
YORKSHIRE
PHILOSOPHICAL SOCIETY

FOR
MDCCCLXXX.
PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 3RD, 1880.

YORK:
J. SOTHERAN, BOOKSELLER, CONEY STREET.

1880.

PATRONESSES

OF THE

Dorsetshire Philosophical Society.

HER MAJESTY THE QUEEN.

H. R. H. THE PRINCESS OF WALES.

PATRONS.

H. R. H. THE PRINCE OF WALES.

H. R. H. THE DUKE OF CONNAUGHT.

HIS GRACE THE ARCHBISHOP OF YORK.

OFFICERS OF THE SOCIETY, 1880.

PRESIDENT :

HIS GRACE THE ARCHBISHOP OF YORK, F.R.S.

VICE-PRESIDENTS :

THE RIGHT HON. LORD LONDESBOROUGH.

WILLIAM HENRY RUDSTON READ, M.A., F.L.S.

EGERTON VERNON HARCOURT, M.A., F.G.S.

THE VEN. ARCHDEACON HEY, M.A.

THE REV. CANON RAINE, M.A.

WILLIAM REED, F.G.S.

JOHN FRANCIS WALKER, M.A., F.L.S., F.G.S., F.C.S.,

(LONDON AND BERLIN) F.Z.S., MEMBER OF THE COMMITTEE OF
THE BRITISH ASSOCIATION.

WILLIAM WALKER, F.G.S.

S. W. NORTH, F.G.S.

TREASURER :

WILLIAM GRAY, F.R.A.S., F.G.S.

COUNCIL :

Elected 1878. THE REV. ROBERT DANIEL.

ALFRED HENRY SPENCE.

WILLIAM LEWIN NEWMAN.

JAMES MELROSE.

Elected 1879. W. C. ANDERSON.

W. ATKINSON.

REV. G. H. HEWISON.

REV. T. B. B. FERRIS.

Elected 1880. THE REV. T. ADAMS, M.A.

EDWIN WADE.

J. L. FOSTER.

W. BARNBY.

HON. SECRETARY :

T. S. NOBLE, F.R.A.S., F.G.S.

CURATORS.

GEOLOGY	W. REED, F.G.S.
MINERALOGY	W. H. HUDLESTON, M.A., F.G.S.
COMPARATIVE ANATOMY . .	T. ANDERSON, M.D.
BRITISH ORNITHOLOGY . .	W. H. RUDSTON READ, M.A., F.L.S.
INSECTS AND CRUSTACEA . .	VEN. ARCHDEACON HEY, M.A.
ETHNOGRAPHICAL COLLECTION	
ANTIQUARIAN DEPARTMENT .	{ REV. W. GREENWELL, M.A. REV. CANON RAINE, M.A.
LIBRARY	REV. G. ROWE, M.A.
BOTANY	WILLIAM MATTERSON, M.D.
CONCHOLOGY	REV. W. C. HEY, M.A.
OBSERVATORY & METEOROLOGY	{ W. GRAY, F.R.A.S., F.G.S. VEN. ARCHDEACON HEY, M.A. <i>under the care of a Committee</i> <i>consisting of</i> { T. S. NOBLE, F.R.A.S., F.G.S.

KEEPER OF THE MUSEUM :

J. C. PURVES, M.D.

REPORT OF THE COUNCIL

OF THE

YORKSHIRE PHILOSOPHICAL SOCIETY,

FEBRUARY 3RD, 1880.

The progress of the Yorkshire Philosophical Society during the past year has been, on the whole, of a satisfactory character. The gross income has been above the average, but, for reasons which will appear in detail in the Reports of the various Scientific Departments, the outgoings of the Society have also been unusually large. With one exception, the income has been the highest ever received by the Society. The Fine Art and Industrial Exhibition which was held at York last year attracted large numbers of people to this ancient City, many of whom visited these grounds. The receipts for admission are higher than in any previous year. The usual custom will be followed in this Report of first drawing attention to the various special items of income and expenditure, and then the state of the various Scientific Departments for the past year will be referred to.

The total income for the past year has been £1504 5s. 6d.; the amount received for subscriptions and arrears, £816 6s.; the gate-money was £374 11s. 5d., and the other sources of income bring up the total to the amount stated. The principal items of expenditure, apart from the sums paid for salaries and wages (which amount to £622 8s. 1d.), are the following:—

Repairs, Painting, and Alterations in the			
Museum	..	..	..
New Cases for Geological Collection	..	97	3 9
Repairs in the Gardens and Greenhouses,			
and cost of maintaining the same	..	167	2 5

The various items of expenditure are set forth in detail in the Treasurer's Report. The total amount of the outgoings for the year is £1566 7s. 7d., being an excess of expenditure over income for the year of £62 2s. 1d., leaving a balance due to the Treasurer of £919 3s. 1d. It has been stated in previous Reports that the greater portion of this debt has arisen in consequence of the cost of the new entrance-lodge and improvements, and it will be seen when the Geological Department is treated of, that the Society has been at a very considerable expense in making arrangements for the display of the magnificent Geological Collection recently presented to the Society by its respected Vice-President, W. Reed, Esq., and which is found to be of far greater extent than was at first anticipated. This collection will place our Museum in the first rank of the provincial museums in the country, so far as the science of Geology is concerned; and in anticipation of the visit of the British Association to York in the year 1881, the Council have spared no efforts to do justice to the collection in order that it may be of the utmost assistance to the workers of Science and a credit to the City of York.

The Honorary Curator of Geology reports that the Yorkshire Collection of Fossils has been enriched by the presentation of a series of fossils, chiefly Ammonites, from the Lias of Whitby, by Mrs. Lloyd, of Lincroft Lodge, Fulford.

Mr. J. F. Walker, F.G.S., has presented two specimens of *Productus horridus*, Sow., from Well, near Ripon. Mr. G. Brown, Monkgate, a very fine Ganoid Fish, *Lepidotus semi-serratus*, Ag., from the Lias of Whitby; and Mr. W. Horne, of Leyburn, a Collection of Corals, Brachiopods and Selachian teeth from the Carboniferous Lime-stone of Wensleydale.

The General Collection has been increased by the following donations:—

A series of Fossils from the lowest beds of the Upper Silurian at Skellgill, above Lowood Inn, in Westmoreland, from Mr. W. Gray, our valued Treasurer.

Two hundred species of Shells from the Newer Pliocene of Sicily, and the same number of species from the Older Pliocene of Tuscany; sixty species of Upper Miocene Fossils from the

Faluns of Touraine, and a hundred species from beds of the same age in the Basin of Vienna have been added to the Collection by Mr. W. Reed, F.G.S., our Honorary Curator.

During the past year the arrangement of the room containing the collection of Fossils occurring in the strata which constitute the first great Division of the Sedimentary Rocks has been completed, and it is now open to the public.

It will give some idea of the importance of the magnificent donation with which Mr. W. Reed has enriched our Museum, when it is stated that the cases of this large room, which formerly contained the whole of the General Geological Collection, now little more than suffice for the Fossils of the Tertiary and Post-Tertiary Formations.

The Collection commences with a complete series of the British Land, Fresh-water, and Marine Shells, systematically arranged in their Classes, Orders, Families, and Genera, these divisions being distinctly marked off by clearly printed labels. This is placed on one side of the upper part of the case, which occupies the whole length of the centre of the room. It is followed on the other side by several series of shells occurring in the glacial and post-glacial muds and sands of England, Scotland, and Ireland. The lower divisions of this central case contain on one side the fossils of the Norwich or Fluvio-marine Crag, and the very fine series of vertebrate remains, for the most part found at the base of the Red Crag; and on the opposite side an extensive collection of Mollusca and other invertebrates of the same formation.

In the wall-cases surrounding the room are placed in descending order, beginning at the left hand of the entrance:—

1. The Pre-historic and Pleistocene Mammalia, including those of the Cromer Forest Bed, numbering 381 specimens, and 654 tablets of shells from the alluvial and marine deposits of the latter period.

2. A very large collection of beautifully preserved fossils from the Coralline Crag, contained in glass-topped boxes, and mounted on 1029 tablets.

3. A fine series of the Newer Pliocene of Sicily, approximately of the same age as the Norwich Crag, 300 tablets, and

a small but interesting collection from the Cabinet of the late Sir C. Lyell, of the Land shells of Madeira and Porto Santo, also of Newer Pliocene date.

In the lower shelves of the same cases are placed the characteristic fossils of the Sub-apennine Beds, or Older Pliocene, of Tuscany, Piedmont, and the South-east of France. A considerable space has been left here to receive a collection of fossils from the Upper Tertiary Beds around Antwerp, correlated with the Crags of Norfolk and Suffolk.

The cases at the lower end of the room have been set apart, for the reception of Miocene fossils. At present they contain, besides other vertebrates, a selection of Mammalian and Reptilian remains from the Sivalik Hills, collected by Dr. Falconer, and presented to the Society by the British Museum. The invertebrates represent the Faluns of Touraine, the Upper Miocene of the Vienna Basin, Bordeaux, and the Hills near Turin.

The Plant remains are from the Lignite Beds of Bovey Tracey, in Devonshire, and from strata of clay interstratified with basalt in Antrim. The former, however, have been quite recently referred to the Middle Eocene, but pending the definitive decision of the question they will remain in their present position in our collection.

The vacant spaces in this case will also shortly be filled up, by the liberality of our Honorary Curator, with the characteristic fossils of the Oligocene or Lower Miocene of Belgium or Germany.

In the cases against the south wall of the room are displayed the fossils of the several divisions of the Eocene Deposits. Beginning with the most recent, they consist of :—

1. Mammalian, Reptilian, and Fish remains, shells of fluviomarine genera, aquatic and terrestrial plants from the Hempstead Beds of the Isle of Wight.

2. Bones of Mammals, Crocodilians, and Chelonians, land and fresh-water Shells and Plants from the Headon Beds of the Isle of Wight.

3. Teeth of several species of Selachians, and a large and beautiful collection of Shells from the Barton Beds, Hants.

4. A well-preserved series of Fossils from the beds of

Brookenhurst, in the New Forest. The stratigraphical position of these beds is somewhat doubtful; the fossils have Oligocene affinities.

5. The next two cases contain a large series of the beautiful Fossils of the Bracklesham Beds, chiefly from Stubbington, Bramshaw, and Brooke, in Hampshire, and 248 specimens of impressions of the leaves of Plants from the Lower Bagshot Beds of Alum Bay, in the Isle of Wight.

The upper shelves of these cases will be occupied by the fine collection of Shells from the Middle Eocene Beds of the Paris Basin, contemporaneous with those of Bracklesham, presented by Lady Murchison.

The two cases which follow are filled with the Fossils of the London Clay, consisting of bones of Mammalia, Reptiles, and Fishes, shells of Mollusca, and remains of Crustacea, from both the London and Hampshire Basins, to which will shortly be added a series of Fruits and other Plant Remains from Sheppey.

The last case contains Mollusca from the Oldhaven Beds near the Reculvers, in Kent; Mollusca and Plants from the fluvio-marine strata of Woolwich and Reading, and Marine Shells of the Thanet Sands from Pegwell Bay and Herne Bay. These are the lowest Tertiary Deposits of the British Islands.

Altogether upwards of 42,000 specimens have been arranged in their biological and stratigraphical order, of which 41,000 have been mounted on tablets, and 3,000—namely, the Shells of the recent British Mollusca and those of the Coralline and Red Craggs of Norfolk and Suffolk—have been specifically identified and distinguished by labels specially printed for the Museum. This has been a work requiring so much labour and time that it has been determined to proceed with the remainder of the collection in a less detailed manner, to mount and classify the specimens generically, and place them in their stratigraphical position, reserving the specific determination and labelling until the general arrangement shall be completed.

During the past year numerous additions have been made to the Antiquarian department. Two fragmentary inscriptions have been acquired. One, discovered during the excavations for the recent Exhibition, is a scanty portion of a tablet

recording some event during the Roman occupation of York in the reign of Hadrian; the other, found in Castlegate, is a carved head which originally stood at one of the angles of a square tomb. Below the head, on two faces, are the letters D.M.—C E, which, up to the present time, have received no satisfactory explanation.

The excavations for the Exhibition disclosed a small hoard of the copper coins which were in circulation in the kingdom of Northumbria up to the middle of the ninth century. The whole number of the coins, comprising about 400 in all, passed into the hands of the Society; but although in very fair condition they do not present any new types. It is generally supposed that these hoards of coins, of which great numbers have been discovered in York, were concealed or lost at the time of the capture of the city by the Danes in A. D. 867.

In the month of July a remarkable deposit was found in the centre of the public road in George Street, Walmgate. It consisted of a number of vessels with small handles or ears on the neck, generally called costrels. They were laid in rows, three deep, packed close together as in a store, and some remains of a wooden rack, or bin, in which they had stood, were discovered with them. Mixed with the costrels were two or three of those curious vessels termed greybeards. Some fifty vessels were found in all, which seem to have been made between 1580 and 1620. The best of these are now in the possession of this Society, and help to mark an epoch in the history of English pottery in York.

The Society purchased at the recent sale at Sheriff Hutton Park a contemporaneous bust in lead of Thomas Lord Fairfax, the celebrated Parliamentary general. There are few persons to whom the city and county of York are so much beholden, and the Society is happy to possess so interesting a memorial of so distinguished a man.

The time has again come round when a fresh edition of the Catalogue will be required, and this is the only period therefore at which it is possible to make any material changes in the arrangement of the Antiquarian collections. Several new cases are needed, and it will be necessary to move some objects out of

the Hospitium into the Ethnological room in the Museum. During the past seven years the collections have increased by one-third, or even more. It is not probable that the extraordinary opportunities which the Society has recently enjoyed will occur again for a considerable period, still it is to be hoped that in future years nothing illustrative of ancient York will be allowed to pass away to other Museums from the city in which it is found, if it can be acquired on reasonable terms. The Curator may mention a special deficiency in the cabinet of coins in examples of the work of the ancient York mint.

The Curator of British Ornithology has to record the early arrival of several large Hawks and other birds, owing, no doubt, to the excessive cold which set in at the beginning of the winter, amongst them the Peregrine Falcon (*Falco peregrinus*), a beautiful male, shot near the toll bar on Bootham Stray, November 10, 1879, in pursuit of Lap-wings, by Mr. William Overton, by whom it has been presented to the Rudston collection; weight, 1 lb. 13½ oz.; length, 15½ inches; width, 37½ inches; also a female of the same species, trapped November 8, at Londesbro'. The Honey Buzzard (*Falco apivorus*), trapped also at Londesbro', September 20, 1879; length, 23 inches, 51 inches across the wings; weight, 3 lbs. 2 oz.

The Pomerine Skua (*Lestris Pomarinus*), shot at Nun Monkton, October 19, 1879.

The Cormorant (*Pelecanus Carbo*), shot on the lake at Kirby Hall, August 23, 1879.

The female Smew (*Mergus Albellus*), uncommon except in hard winters, shot at Grimston, near Tadcaster, November 10, 1879.

The Sanderling, in singular plumage, shot at Nun Monkton in December, 1879.

The Black Woodpecker (*Picus Martius*), male, very rare in the British Isles, sent fresh in the flesh from the neighbourhood of Hull on November 12th to Mr. Relph, Feasegate; weight, 10 oz.; 29 inches across the wings, length, 17½ inches; kindly presented to the Rudston Collection by Mrs. Relph.

Insecta and Crustacea.—The Allis Collection of Lepidoptera has been carefully tended, and is in good condition. In the other orders of Insects, and also in Crustacea, the collections are defective, and have received no additions during the year.

The Curator of Comparative Anatomy reports that the valuable collection under his care remains in much the same condition as last year. It still needs the attention of a skilled Articulator, and it is hoped that the finances of the Society may soon admit of this being obtained.

The Curator of Botany reports that the British and Foreign Herbaria are in a fair state of preservation. There have been no additions to this department during the year.

The Curator regrets that the severe winter has destroyed many of the branches of the Laurels and Aucubas in the Gardens, but hopes that, if the spring is fine, they may spring up from the roots. The reports from France and Belgium testify to the same facts, and state also that the terminal branches of the Fruit Trees have also suffered.

METEOROLOGICAL REPORT, 1879.

The mean height of the mercurial column corrected to 32° Fahrenheit, and mean sea level was 29·923; the minimum reading, which occurred on the 10th February, was 28·790; the maximum, on December 13th, 30·739, and the range, therefore, 1·949. The mean temperature for the year was 45·17, or 2·56 below a mean of 50 years. The mean of the three warmest months of the year, June, July, and August, was only 57°·3, and the highest temperature recorded during the same period 75°. In four nights of the month of May the thermometer registered under 32°, namely 30° on the 2nd, 29° on the 3rd, 32° on the 5th, and 27° on the 10th. The means of January and December were only 31°·7 and 30°·8 respectively, and it was in the latter month that the most severe cold was felt, the lowest readings being 8° on the 4th, 3° on the 8th, and 0° on the 7th, in the Museum Gardens; but in several localities around York considerably lower observations were recorded, for example,

at the Friends' School in Bootham the thermometers marked 3°·5, and those of Mr. J. Backhouse, of Westbank, as low as 6°·5 on the night of the 7th.

The maximum temperature of the year was 75°, observed in 2 days in July and 3 in August; the minimum, as has been stated, being 0, gives an annual range of 75°.

The amount of rainfall during 1879 was 23·02 inches, being 4·85 less than the average of the last ten years, but the number of days in which rain fell in 1879 exceeded by ten the average of the period just mentioned.

We do not as yet, at this station, possess an instrument for the registration of the duration of sunshine; but there can be no doubt that in the past year it was very much below the average, as may be inferred from observations taken at Greenwich, where such an instrument has been in use for some time. Mr. Symons, F.R.S., states in his Meteorological Report for the past year that the total duration of sunshine recorded at the station above mentioned during the months of May, June, July, and August amounted to 516 hours only, or little over an average of 4 hours daily during what are usually the sunniest months of the year.

With respect to the winds, the most noteworthy point has been the unusual prevalence of those blowing from an easterly quarter, as will be seen from the following summary:—

N. to E.—E. to S.	S. to W.—W. to N.
1877—111 days.	254 days.
1878—138 „	227 „
1879—170 „	195 „

A mean of ten years given by Professor Phillips shews—

N. to E.—E. to S.	S. to W.—W. to N.
131 days,	227 days,

or very nearly the same proportion as in 1878.

Thus the meteorological characteristics of the past year may be summarily described as consisting of low temperature, persistent rain, absence of sunshine, and abnormal prevalence of easterly winds, a combination of conditions amply sufficient to account for the very unsatisfactory results of agricultural operations.

COMPARATIVE PREVALENCE OF WINDS.

N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.
42	9	21	10	49	8	17	14
82				88			=170
S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.
48	8	20	24	67	4	12	12
100				95			=195

The greatest heights reached by the River Ouse above its summer level were the following :—

1st January, 8 feet; 10th February, $7\frac{1}{2}$ feet; 21st July, $8\frac{1}{2}$ feet.

It was frozen over from the 4th to the 24th December.

MEMBERS.—15 Members, 11 Lady Subscribers, and 5 Associates of the Society have resigned during the past year; 11 Members and 6 Lady Subscribers have been lost to the Society by death, whilst 17 new Members, 1 Lady Subscriber, and 5 Associates have been elected during the past year.

The Council have to regret during the past year the comparatively sudden decease of J. H. Gibson, M.D., one of the Vice-Presidents of this Society. Dr. Gibson presented to us some years ago the magnificent Skeleton of the Moa, which is one of the most conspicuous and valued objects in the Osteological Room. He also rendered great assistance to the Curator of Antiquities in his department; whilst the arrangement of the new Ethnological Room in the Museum is entirely due to Dr. Gibson's extraordinary energy and good taste.

The Council recommend for election as new Members of Council the Rev. T. Adams, Edwin Wade, Esq., J. L. Foster, Esq., and W. Barnby, Esq., in the place of J. P. Wood, Esq., Richard Pearson, Esq., E. W. Smithson, Esq., and Wm. Barnby, who retire by rotation.

The Council also nominate S. W. North, Esq., as Vice-President, in the room of Dr. Gibson, deceased.

METEOROLOGICAL REGISTER, YORK, 1879.

BAROMETER.				RAIN.		THERMOMETER.				
Month.	Highest.	Lowest.	Mean.	Inches.	Days.	Average Maximum.	Average Minimum.	Mean Temp.	Highest.	Lowest.
Jan.	30·518	29·479	30·072	1·13	10	35·9	27·5	31·7	49	19
Feb.	30·173	29·790	29·531	2·47	21	39·7	32·5	36·1	51	25
Mar.	30·581	29·519	29·755	1·00	18	46·5	34·0	40·3	56	24
April	30·332	28·992	29·730	1·68	19	49·7	35·8	42·8	59	27
May	30·545	29·570	30·004	1·83	19	56·0	39·2	47·6	67	27
June	30·162	29·416	29·753	3·09	23	63·0	48·6	55·8	70	41
July	30·072	29·178	29·736	4·17	18	63·3	50·8	57·6	75	45
Aug.	30·217	29·221	29·767	2·65	21	66·1	50·8	58·5	75	42
Sept.	30·410	29·285	29·921	1·97	14	61·8	45·9	53·9	71	31
Oct.	30·561	29·171	30·108	0·89	15	55·5	39·7	47·6	65	30
Nov.	30·575	29·536	30·221	1·19	14	45·1	33·6	39·4	58	25
Dec.	30·739	29·304	30·260	0·95	13	37·0	24·6	30·8	55	0
			29·923	23·02	205			45·17		

RAINFALL, 1879.

Month.	Total Depth.	Greatest Fall in 24 Hours.			Days on which it or more fell.
		Inches	Depth	Date.	
Jan.	1·13	·48	15	10	
Feb.	2·47	·42	16	21	
Mar.	1·00	·15	18	18	
April	1·68	·31	9	19	
May	1·83	·37	30	19	
June	3·09	·72	8	23	
July	4·17	·78	21	18	
Aug.	2·65	·36	20 & 28	21	
Sept.	1·97	·30	9	14	
Oct.	0·89	·28	15	15	
Nov.	1·19	·27	21	14	
Dec.	0·95	·22	31	13	
	23·02				

The following Lectures have been delivered in the Theatre of the Museum during the past year.

SUBJECT.	NAME OF LECTURER.
Recent Solar Researches	{ R. A. PROCTOR, Esq., B.A., F.R.A.S.
Egyptian Obelisks and the Rude Monoliths of Western Europe compared with the View of Discovering the Uses of the latter	{ THE REV. W. C. LUKIS, M.A.
The Telephone: Its History and Construction, with a Brief Historical Sketch of the Progress of the Science Electricity	{ THE REV. H. HUNNINGS, M.A.

THE TREASURER IN ACCOUNT WITH
THE YORKSHIRE PHILOSOPHICAL SOCIETY
FOR THE YEAR 1879.

Dr.

INCOME.

1879.

£. s. d.

£. s. d.

Annual Subscriptions, &c.:

Members

Lady Subscribers

Associates

Arrears

Admission Fees of New Members:

Paid in Full

Paid by Instalments

Composition in lieu of Subscriptions,

F. Thorpe, Esq.

Keys of the Gates

Temporary Subscribers

Donations

Rents:

St. Mary's Lodge

Swimming Bath

Mr. Sykes, Towers

Boat Yard

Water Works Co.

Gate Money

Profits of Whitsuntide Admissions

Sale of Catalogues

Hire of Tent

Meteorological Society for Reports

Excess of Expenditure beyond Income

£1566 7 7

1879.

£. s. d.

£. s. d.

Crown Rent

Corporation Rent

Water Rent

Rates and Taxes

Insurance

Salaries and Wages:

Dr. Purves, balance to

31st Dec.

Mr. Wakefield, balance

to 22nd July

Clerk

J. Davison (Pension)

J. Fielden

Lodge Keeper

Attendant, Museum

Do., Hospitium

Gardeners

Yorkshire Insurance Company, interest on loan

Interest and Commission to Bankers

Repairs, Painting, Alterations, &c.:

Museum

Do., new Cases

Observatory

Estate

Hospitium

Gardens and Greenhouses:

Repairs, Painting, and General Expenses

Asphalting Walks and laying down Grass

Coals and Coke

Antiquities

Stationery, Printing, &c.

Printing Report

Coals, Gas, and Coke

Lectures

Military Bands

Library: Books and Binding

Cost of Repairing Tent

Meteorological Reports and Observations

Miscellaneous General Expenses

Balance due to the Treasurer, 31st Dec., 1878

Excess of Expenditure, 1879

Permanent Debt:

Yorkshire Insurance Company

Due to Two Members, £50 each

1900 0 0

100 0 0

2000 0 0

1 0 0

19 11 8

4 9 6

14 9 5

5 2 6

214 8 7

22 10 0

25 0 0

26 0 0

70 4 0

39 0 0

46 16 0

23 14 6

154 15 0

622 8 1

74 8 4

33 6 4

136 1 1

97 3 9

2 10 11

35 4 8

22 12 0

293 12 5

118 18 5

37 14 0

10 10 0

187 2 5

65 4 8

16 11 10

10 0 0

47 0 1

27 4 2

30 7 3

44 4 2

44 18 4

14 4 6

31 1 11

857 1 0

62 2 1

919 3 1

1900 0 0

100 0 0

2000 0 0

Audited and found correct, York, February 2nd, 1880,
W. GRAY, F. L. MAWDESLEY.
Treasurer.

HONORARY MEMBERS PROPOSED FOR ELECTION, 1880.

Professor A. C. Ramsay, LL.D., F.R.S., Director General of the Geological Survey of the United Kingdom.

Archibald Geikie, LL.D., F.R.S., Director of the Geological Survey of Scotland, Professor of Geology in the University of Edinburgh.

Professor Edward Hull, M.A., F.R.S., Director of the Geological Survey of Ireland.

George Allman, M.D., LL.D., Emeritus Professor of Natural History in the University of Edinburgh.

FOREIGN MEMBERS.

Dr. Henri Milne-Edwards, Member of the Institute of France, Professor of Natural History, Jardin des Plantes, Paris.

Joachim Barrande, Corresponding Member of the Imperial Academy of Science of Vienna.

The Honorable Clarence King, Director of the United States Geological Surveys.

Dr. F. V. Hayden, Director of the Geological Survey of the Territories, United States.

Professor Adolph Eric Nordenskjöld, Stockholm.

Edmond Hebert, Member of the Institute of France, Professor of Geology at the Sorbonne.

Dr. Eudes Deslongchamps, Professor in the Faculty des Sciences of Caen.

F. Quenstedt, Professor of Geology and Palæontology in the University of Tübingen.

Ferdinand Roemer, Professor of Geology and Palæontology, Breslau.

MEMBERS ELECTED IN 1879.

Ramsay, J., M.D., *Petergate*.
 Barstow, C. D., *Garrow Hill*.
 Ridgway, Mrs. H. Akroyd, 2, *Burton Lane*.
 Chadwick, James, 24, *St. Saviourgate*.
 Daniel, Colonel, *Bootham*.
 Dale, Miss, *Park Street, The Mount*.
 Glaisyer, John, 1 and 2, *Castlegate*.
 Hutchinson, Mrs., 25, *De Grey Street*.
 Clayton, James, 49, *Goodramgate*.
 Hopton, Henry Stephen, *Blake Street*.
 Hardcastle, H., *Clifton Green*.
 Dugdale, Capt. Arthur G., *Blake Street*.
 Allen, Thomas, 76, *Micklelegate*.
 Thorp, Mrs. Sarah, *Park Grove*.
 Hartley, R. W., *National Provincial Bank*.
 Adams, The Rev. Thomas, *St. Peter's School*.

LADY SUBSCRIBER IN 1879.

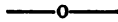
Beckworth, Miss, *Trinity House, Trinity Lane*.

ASSOCIATES IN 1879.

Kimber, Joseph, *Duncombe Place*.
 Forbes, Charles, *Lendal*.
 Davy, J. S., *Club Chambers*.
 Pulman, John Henry, 17, *St. John Street*.
 Bracey, R. M., *National Bank*.

RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEBRUARY 3RD, 1880.



1. That the Report of the Council now read be adopted and printed for circulation amongst the Members, Lady Subscribers, and Associates of the Society.
2. That the thanks of the Society be given to the Members of Council retiring from office, also to the Treasurer, Secretary, and Curators for their valuable services ; and that authority be given to the Council to give admission to the Public to the Museum on Whit-Monday and Tuesday, under the same regulations as last year.
3. That the thanks of the Meeting be given to the Chairman.

BOOKS PURCHASED.

- Catalogue of Cretaceous Fossils in the Museum of Practical Geology.
 Catalogue of the Cambrian and Silurian Fossils in the Museum of Practical Geology.
 Catalogue of Tertiary and Post-Tertiary Fossils in the Museum of Practical Geology.
 Professor Ramsay's Geological Map of England,
 The Geology of England and Wales, by H. B. Woodward.
 Index Palæontologicus, by Dr. H. G. Bronn—3 vols.
 Description des Fossiles des Terrains Miocènes de l'Italie Septentrionale, by G. Michelotti.
 Primæval World of Switzerland, by Professor Oswald Heer.
 Handbuch der Zoologie, by Carus and Gerstaecker.
 Traité de Zoologie, by C. Claus.
 Manual of Mineralogie, by Professor Dana.
 Lyell's Students' Elements—last edition.
 Mantell's Medals of Creation—2 vols.
 Catalogus Conchyliorum Regni Napolitani, by A. Scacchi.

LIBRARY.

- Academy, The Atti della R. Accademia dei Lincei,
 1879.
 Association, Geologists' .. Proceedings, vol. vi., Nos. 1, 2, & 3.
 Association, British Report for 1877.
 Author, The Geological History of East Yorkshire,
 by the Rev. J. F. Blake, M.A.,
 F.G.S.
 Author, The Roman Rotherham, by J. D. Leader,
 F.S.A.
 Author, The The Yorkshire Oolites, part ii., sec. 2,
 by W. H. Huddleston, Esq., M.A.,
 F.G.S.
 Club, Warwickshire Field Proceedings, 1878.
 Council, Meteorological .. Reports of the Permanent Committee
 of the First International Meteorological Congress at Vienna.
 Report of the Meteorological Council
 of the Royal Society for the period
 of 10 months, ending March, 1878.

- Council, Meteorological .. Quarterly Weather Report, October—December, 1875.
Contributions to our Knowledge of the Arctic Regions, part 1.
- Fairbank, Dr. F. Royston Les Polynesiens et leurs migrations, par M. de Quatrefages.
Rapport sur les progrès de l'Anthropologie, par M. de Quatrefages.
- Hargrove, Mr. A..... Twelve first numbers of the *York Herald*.
Translation of the York Charters.
- India, Governor-General of Records of the Geological Survey of India, vol. xi., pts. 1—4.
vol. xiv.
vol. xv., pt. 1.
vol. xii., pts. 2 and 3.
Memoirs of the Geological Survey of India, vol. i., pt. 3 of ser. iv.
vol. i. of ser. xii.
vol. xvi., pt. i.
Palæontologia Indica, ser. xiii., pt. 1, and ser. ii., pt. 4.
- Institution, Royal, of Great Britain } Proceedings, vol. viii., pts. 5 and 6.
- Institution, Smithsonian .. Report for 1877.
- Novara, Civic Library of .. Statuta Communitatis Novariæ.
- Office, India Views taken from the Colaba Observatory.
- Publishers, The Nature for 1879.
- Read, Mr. W. H. Rudston Journal of the Linnean Society :
Zoology, Nos. 77—80.
Botany, Nos. 100—103.
Transactions of the Linnean Society :
Zoology, vol. i., 2nd ser., pts. 3—7.
Botany, vol. i., pts. 3—6.
Journal of the Royal Horticultural Society for Dec., 1878, March, 1879.
- Reed, Mr. W. Appendix to Woodward's Manual of the Mollusca.
- Society, Chemical Journal for 1879.
- Society, Zoological Vol. x., parts x, xi.
- Society, Geological Quarterly Journal, 1879.,

- Society, Leicester Literary and Philosophical } Report for 1879.
 Transactions, part v., and from June, 1850, to June, 1855.
- Society, Leeds Philosophical and Literary } Report, 1878—9.
- Society, Hull Literary and Philosophical } Transactions, 1878—9.
- Society, Whitby Literary and Philosophical } 56th Report.
- Society, Leeds Literary and Philosophical } Studies in Comparative Anatomy by Miall and Greenwood; No. II. The Anatomy of the Indian Elephant.
- Society, Liverpool Literary and Philosophical } Vol. xxxii., 1877—78.
- Society, Edinburgh Royal Transactions, vol. xxviii., pt. 2.
 Proceedings, Session 1877—78.

SERIAL WORKS SUBSCRIBED FOR.

- Birds of Asia, by John Gould, F.R.S.
- Natural History of the Tineina, by H. T. Stanton, F.R.S.
- Nautical Almanack.
- Proceedings of the Zoological Society.
- Publications of the Palæontographical Society.
- Publications of the Ray Society.
- Sowerby's Thesaurus Conchyliorum.
- London, Edinburgh, and Dublin Philosophical Magazine.
- Annals and Magazine of Natural History.
- Geological Magazine.
- Journal of the British Archæological Association.
- Numismatic Chronicle.
- Memoires de la Société Paléontologique Suisse.
- D'Orbigny's Paléontologie Française.
- Geological Record.

DONATIONS TO THE MUSEUM.

GEOLOGY AND MINERALOGY.

- Gray, Mr. W. Fossils from the lowest beds of the
Upper Silurian at Skellgill, above
Lowood Inn.
- Lloyd, Mrs. A Collection of Fossils from the Lias,
Whitby.
- Reed, Mr. W. 100 species of Miocene Fossils from
the Vienna Basin, and 60 species
do. do. from the Faluns of Touraine.
- Walker, Mr. J. F. Specimens of *Productus horridus*, Sby.,
from Well, near Ripon.
- Horne, Mr. W. A collection of Carboniferous Lime-
stone Fossils from Wensleydale.
-

ZOOLOGY.

- Coke, Mrs. Two opercula of Shells from the Fiji
Islands.
- Melrose, Mr. Ald. Starling (albino), shot at Clifton Croft
on Easter Monday, 1878.
- Key, Mr. Sam. A fine specimen of *Cygnus Bewicki*,
Yarrel (Bewick's Swan), shot on
Strensall Common, near York, by
Col. Hill, R.H.A., on February
10th, 1879.
A specimen of *Phasianus Colchicus*, var.
torquatus, Gmelin, male.

ANTIQUITIES.

Rev. W. A. Wightman ..	A Brass Medal with figures of SS. Ignatius and Francis, found in Stillingfleet Churchyard.
Excavation Committee ..	Encaustic Tiles from Newminster Abbey, near Morpeth.
Rev. F. J. Steele	Coped Tomb-stone of Saxon Child, and part of Saxon Cross, from Ingleby Arncliffe.
The Committee of the York Exhibition	} A fragment of a Roman inscription with the titles of Hadrian; a large Mortar; four hundred Stycas, etc., found in the grounds of the Exhibition.
Captain Griffiths, Flaxton	Head of a Mummy, Beads, &c., from tomb, near Thebes; Infant Crocodiles from the pits near Cairo.
Mr. James Backhouse	Flints from Spiennes; Spear-head from Admiralty Islands; specimens of Obsidian from Mexico.
Purchased	Large two-handled green glazed Jug from Tockwith; Glass Bottles from Welburn and Kilburn.
Mr. Lund, York	Stone carving of an Angel, found in Low Petergate.
Purchased.....	Samian Cup; greater part of Samian Bowl, and base of Roman Altar, found in Stonegate.
Purchased	Roman Urns, found in Burton Lane and at the New War Office.
Purchased	Mediæval Screen and Stall-work from Drax, and Fakenham, Norfolk.
Purchased	Two Samian Cups, Pewter Alms Dish from Coney Street Church; two Snuff Graters, two silver Seals, &c., from Mr. J. Summer's sale.
Mr. Taylor, Builder, York	Mediæval Pottery, found in Church Street.

Purchased	A Roman Monumental Stone, inscribed D. M—C. E., found in Castlegate.
Miss Duncombe, York	A Roman Urn, from the Railway ex- cavations.
Mrs. Pulleine, Bootham, } York	A number of Caffre Dresses and Weapons, collected by the late Col. Pulleine.
Purchased	A large number of Costrels and other vessels, found in George Street.
Purchased	Two Cyprian Vases, and a New Zealand Grave God, from Dr. Gib- son's sale.
Purchased	A contemporaneous Bust in lead of Thomas Lord Fairfax and two iron- bound Chests, from Sheriff Hutton Park.
Purchased	Glass Bottle and ancient pair of Skates, found in Pavement.
Mr. T. W. U. Robinson, } Houghton - le - Spring, } Durham	Roman Tile from Slack; Celt from Portland; Perforated Pin, Knife with handle, &c., from Swiss Lake Dwellings.
Purchased	Silver Coin of Eanred, King of North- umbria, and Roman jet Ring,

COMMUNICATIONS
TO THE
MONTHLY MEETINGS
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,
1879.

OCTOBER 7TH.—DR. PURVES read a paper "On the European Deposits of the Pliocene Age," with special reference to the fossils of that period in the Society's Museum. He described the coralline, red, and Norwich crags of England, the crags of Belgium, the sub-Apennine beds of Italy, and the enormous development of strata of the Pliocene period in Sicily, where, he said, deposits of that age might be seen dipping under the eastern base of Etna—a proof that the whole of that enormous volcanic pile had been accumulated since they had formed part of the Mediterranean floor, and yet they contained only five species of shells which were not now found living in that sea. He also explained the plan adopted in the arrangement of the general Geological Collection of the Museum.

NOVEMBER 4TH.—DR. PURVES again read a paper on the "Pliocene Deposits of Europe." He described in detail the sub-divisions of the sub-Apennine beds of the Italian peninsula, which, he said, from their immense development, the abundance and perfect state of preservation of their fossils, but, above all, from their presenting a complete, unbroken succession of strata, extending from the Miocene up to the post-tertiary periods, were entitled to be considered as the typical deposits of the pliocene age. He attempted to correlate these groups with those of Belgium and England, but pointed out that this could be done only in a very general manner, in consequence of the

difference of latitude and the diversity of conditions of deposition. The relations of the fossils of the several horizons were dwelt upon, and the evidence which they afforded with respect to the climate of the period, showing a progressive refrigeration from the lower to the upper strata, in the latter of which the sub-Arctic character of some of the shells indicated that the glacial epoch was already making its approach felt in the Mediterranean region. He then sketched the physical geography of Italy during the deposition of these strata, and described its terrestrial fauna, most of the species of which, he said, had inhabited England during the same period, as proved by their remains found both in the coralline and red crags. After describing the fossils of the Belgian and English crags, the evidence of which relative to the climate of the period corroborated the conclusions arrived at by the study of the sub-Apennine beds, he inquired what evidence we had for estimating the length of the interval which had elapsed since these strata had been deposited. Etna, the immense bulk of which is post-pliocene, proves that that interval must have been enormous; but the changes in the physical geography of England, known to have taken place in the same interval, are even more calculated to strike the imagination. Since the latest of the crags was deposited we have proofs that England has been twice united to the Continent, and once in great part submerged several hundred feet beneath the sea. Sir C. Lyell, basing his calculations upon the rate at which oscillations of level of the earth's crust are known to be taking place at the present day, estimated that such a rising and sinking required at least 224,000 years for its completion. Dr. Croll, of the Geological Survey of Scotland, proceeding upon astronomical data, has computed that the glacial period had its commencement more than 240,000 years ago, and we have clear evidence that this also happened long after the termination of the crag or pliocene period.

APRIL 1ST.—THE REV. CANON RAINE read the following paper:—

Within the last few weeks the excavations for the Exhibition

of Fine Arts have yielded a fragment of an inscription which bears some of the titles of the Emperor Hadrian. It was lying at the upper end of the garden, not far from the wall, about three feet only beneath the surface. It is evident, therefore, that the inscription had been found and wilfully fractured in mediæval times. The Monks made a point of destroying, as idolatrous, every lettered memorial of Roman days. Some search was made for the remaining portions of the inscription, but without success. It is extremely probable that they are still buried at the upper end of the garden, and, in some happy day, I trust they will be discovered.

The earliest inscription in our Museum seems to be that of the standard-bearer of the ninth legion, which Dr. Hübner ascribes to the first century after Christ. This has been so much exposed to the weather for 150 years that we can scarcely do justice now to the skill of the designer and sculptor. Our second inscription in point of date is the noble tablet recording some work executed by the ninth legion at the bidding of the Emperor Trajan. Some of the letters on this grand memorial are six inches long, and the whole are beautifully cut. This tablet was set up in the year A.D. 108-9. Our third inscription at York in point of date is the scanty fragment, recently discovered, which is as yet the only stone connecting Hadrian with Eburacum. He was in Britain, as we know, about the year A.D. 120, exciting the spleen of illnatured critics in Italy by the way in which he marched, bareheaded, in the front of his soldiers. Of course, he would visit Eburacum, and as it was during this visit that he began the erection of the great Roman wall and its stations, to which Eburacum was the depot, it was probable enough that he would authorise the erection of various buildings in this city for the advantage of the public service. This fragment was, perhaps, a portion of a large inscription which was affixed to the front of one of these.

A few letters alone remain to us, in two lines. They fill up parts of a well-known formula which is undoubtedly connected with Hadrian. The style of the letters also is that of his time. In the upper line are portions of the great name Trajan; in the second we have A V G · P—the last letter being the first

of the title *pontifex maximus*. There was formerly an inscription, also imperfect, in the church of Bowes with which ours, most probably, was, in the beginning at least, nearly, if not entirely, identical. It ran as follows, in an extended and amended form:—*Imperatori Cæsari divi Trajani Parthici filio, divi Nervæ nepoti, Trajano Hadriano Augusto, pontifici maximo, tribunicia potestate —, consuli —, patri patriæ*; and then followed, probably, for the rest is uncertain, the name of the cohort which set the stone up, the imperial legate, and the commanding officer. Of some such nature, I doubt not, was the inscription of which we have here only a fragment. It will be observed that Hadrian calls himself by the name of Trajan, styling himself at the same time his son and the grandson of Nerva. The relationship was that of succession—not of birth. It was the fashion of the time to do this. Hadrian and his assumed ancestors were worthy of one another. It was very different with some of those unworthy wearers of the imperial purple who took to themselves the honoured names of Antoninus Pius.

There are only two memorials of Hadrian in Yorkshire, and this is one of them.

Mr. Wellbeloved has stated in his "Eburacum" that Hadrian sent over the sixth legion in the first year of his reign (A.D. 117), and under the command of M. Pontius Lælianus, and that he came himself in A.D. 120. This is given on the authority of an inscription recorded by Grüter and Orelli. It has since been discovered by Henzen that this inscription is made of parts of two, which have been put together. We must therefore dismiss M. Pontius Lælianus as alien to the sixth legion. The fact, however, remains that some unknown person, in the latter, not the earlier, part of the reign of Hadrian crossed from Germany to Britain with the sixth legion victorious, as tribune of the soldiers, and that he lived to return to Rome, where, in the days of M. Aurelius, he was honoured with a statue. It is quite possible that this legion first touched the British shore at South Shields. An altar, which it dedicated to Neptune, the sea-god, has been recently found in the Tyne, at Newcastle.

It has also been stated that the sixth legion took the place of the ninth, which had been at Eburacum for some time. We

know at least that it was here in A.D. 108—9. What became of the ninth after the advent of the sixth? There is no record of its being sent to any province abroad, and it has been supposed, therefore, that it was destroyed by the natives in war. A passage in Spartian's *Life of Hadrian* gives some weight to this suggestion. It may have been seriously weakened in this way, but it was by no means obliterated. If we may judge from the large number of tiles at York which bear the stamp of the legion and the character of the numerals upon them, which are of much later date, many of them, than the times of Hadrian and the Antonines, we see that some of the men of the ninth legion were living and working at York long after the period assigned to their destruction. It is probable, I think, that they were much weakened in battle, and that on that account they were practically merged in the sixth, and it may have been their duty to do garrison and home work whilst the men of the sixth were scattered among the stations on the walls of Hadrian and Antoninus.

Nov. 2ND—The following paper by the REV. CANON RAINE was read :—

In speaking about the Church of St. Olave, I must premise that my remarks relate especially to the present building which bears that name. The history of the earlier church may be briefly summarized. It was built originally by Siward, Earl of Northumberland, who died in A.D. 1055. Olaf, King of Denmark, to whom it was dedicated, died in A.D. 1030. It would be some time after his decease before the honor of sanctity was ascribed to him, and the commencement of St. Olaf's Church in this city can scarcely be placed earlier than A.D. 1045 or 1050. It would be dear, I doubt not, to the Danes, of whom York was full, and of whom Siward was one. After the Conquest the church passed, as a piece of private property, to Alan, Earl of Brittany, who gave it, somewhere about the year 1080, to Stephen, Abbot of Whitby, to be the nucleus of an ecclesiastical establishment. Eight years after this, William Rufus paid a visit to York, and observing that the monks were sorely pinched for room on the side of St.

Olaf's, he gave them four acres of the ground now occupied by the Museum gardens, on which they soon erected a larger abbey, which they dedicated to St. Mary. The Danish influence, it may be observed, had at that time passed away: hence the change of name. But what did the monks do with St. Olaf's Church, which had sheltered them for a while? It relapsed into its original position. Every monastery was obliged to find a place of worship for the retainers of the house and the inhabitants of the precinct, apart from the monastic services. Such a place the monks of St. Mary's found in the Church of St. Olaf. It was served by one of the monks; it had no endowments, and was entirely dependent upon the neighbouring abbey.

In the beginning of the fourteenth century we find in existence close to the west end of St. Olaf's Church a chapel, belonging to St. Mary's Abbey, and dedicated to St. Mary, for which a fair endowment had been made. It would naturally seem absurd to maintain two places of worship in such close proximity to each other when one would suffice; and as St. Mary's possessed an endowment, whilst St. Olaf's had none, the monks would wish to get rid of the burden of maintaining the fabric and supplying the duty at the latter. We are not surprised, therefore, to find that St. Olaf's Church was allowed to fall into decay. In 1395 the nave was greatly dilapidated, and Archbishop Arundel ordered that it should be put right. Matters, however, went on from bad to worse, until in the middle of the following century the inhabitants of Marygate and that district took the case up very strongly. In 1458 Roger Stanes, of Marygate, left 6s. 8d. in his will to glaze a window behind the door of the church. In 1463 Thomas Hornby, rector of Stokesley, bequeathed five marks to the fabric of the nave, if the parishioners should begin it within the next two years. These gifts, and all other legacies and dues would pass into the hands of the abbot and monks of St. Mary's. The discontent, however, increased so much that the question as to the claims of the parishioners and the abbey was left to the decision of Archbishop George Neville, who made his formal award on the 24th of October, 1466. The document

is a most curious one. The abbot and monks are called the proprietaries of the parish church, or church served by a curate, of St. Olave. For the future it is to be regarded as a parish church, and the parishioners are to build, repair it, and find the necessary ornaments, except for the chancel. The outer wall on the north side of the nave is to be rebuilt after the pattern of the outer wall on the south side. The parishioners are to build and repair the church, which is now in ruin, before Michaelmas, 1468, with the following help from the abbey. The monks are to give them twenty large oak trees and 10% in money; also vestments for priest, deacon, and sub-deacon for festivals; two other suits for Sundays and holydays; also three copes, and a chalice and paten of silver, by next Easter; they are also to see that the church is consecrated within the three months next following; to provide a font, and a cemetery properly enclosed. The parishioners for the future are to receive all legacies and gifts to the fabric.

On the twenty-fifth of March following, the last day of the year, 1466, according to the then reckoning of time, there was a service in the chapel of St. Mary, at the east end of St. Olave's, and which was evidently used as the parish church for the time being. At this service Simon Ward, a monk of St. Mary's, as the representative of his brethren, recited in English the terms of the Archbishop's recent award, and, in the presence of many of the parishioners, paid over £10 in gold into the hands of Robert Plompton, Thomas Girssop, Richard Wasdall, and John Vinter, wardens or keepers of the fabric of St. Olave's. He also gave them a vestment of green cloth of gold for festivals, to be worn by priest, deacon, and sub-deacon; another vestment of the same material and colour for Sundays, and one of a substance called "Burd-Alexandre," probably from Alexandria, for holy days; also three copes, one of green cloth of gold, and the other two of green "Burd-Alexandre," together with a chalice and paten of silver gilt. When the monks had made up their minds to do their duty, they did it well.

From this most curious document we see the creation of a parish church, so changed from the preceding structure that it was necessary to consecrate it. The earlier building was

probably the old Norman fabric. We get the date of the body of the present church, and learn that the south wall was similar to that on the north side which still remains. It is also I think, pretty evident that the eastern wall which is now being removed marked the chancel which was built in 1466 or 1467. The traces of walls which have been found outside belong to some earlier fabric.

We must not suppose, however, that the church of St. Olave was completed by Michaelmas, 1468. The tower was erected some years afterwards. In 1478 Robert Plumpton, who was one of the keepers of the fabric in 1466, leaves 40s. in his will towards a stone tower; and in 1483 Lawrence Yole leaves to the same tower three glass windows. The fabric, therefore, must have been then ready to receive them. But bells were still required. In 1501 a parishioner leaves the modest sum of 12d. to the bells of the church, which had been lately bought. This shows that they had been procured, and that they were not quite paid for.

The church which was thus erected ought to have been in excellent condition at the present day, but it was so much injured during the civil wars that it became necessary to rebuild it, with the exception of the north wall. In the Archbishop's registry there is a document dated 25th September, 1723, stating that the church had been lately rebuilt, and directing an apportionment of the sittings. The churchwardens' books will probably give a fair account of this more modern restoration.

In the vacant space between the present gateway and the tower of St. Olave's Church stood a chapel, known as the chapel of St. Mary, or our Lady at the Gate. It is not known when it was first built, but we have in Drake (p. 603) a copy of a deed by which Alan, Abbot of St. Mary's, and his brethren bound themselves and their successors to a person of the name of John of Hellebeck to establish and continue a chantry in the chapel for the soul of the founder. Hellebeck had provided a respectable endowment in the shape of five tofts and four oxgangs of land in Myton. This building was called the high chapel, so that it stood on what may be called an upper floor, to which you would ascend by a stone stair. On the outside, on

a pillar or large bracket facing the west, stood an image of the Blessed Virgin. In 1402 a York merchant of the name of Richard Chase left by will a tenement to maintain a light which burned there. There was another image of the Virgin Mother inside, to burn before which, in 1438, Thomas Arnold, vicar of Overton, bequeathed a candle of wax, weighing five pounds. He also left a service book, called a Portiforium, to be fastened in the chapel by an iron chain. It was divided into two parts, called dimidials, or half years; that is, the services for the summer and winter seasons were distinct and bound apart. In 1458, a rector of Stokesley ornamented by will the altar in the chapel with an altar-cloth of Viennese work. Associated with this chapel, and holding its meetings probably in some room on the basement, was, in 1436, a guild bearing the name of St. Mary. It was composed, probably, of some of the inhabitants of Marygate and of the servants of the neighbouring abbey. The chapel stood in a somewhat noisy and turbulent place. Marygate in those days had the privilege of sanctuary, which was by no means conducive to the peace or respectability of its inhabitants, and then, around the entrance to the great abbey, for this was the only entrance, there would always be a little group of idlers, and hucksters, or bargees. The entrance door was not where the present iron gate stands, but was thrown a little inwards, and in the intervening space, which was arched over, and had stone seats, there would often, as was the fashion in a monastic precinct, be pedlars and others waiting and chaffering with their wares. The first object which the monk beheld as he came through the archway on his road to the city was the figure of the Blessed Virgin high above him against the wall of the chapel, illuminated by the lamp which never was suffered to die down.

In the first Register Book belonging to the city of York there is an account of a singular incident connected with this chapel of St. Mary. On Wednesday, the 25th of May, 1379, the day before Ascension Day, a barge belonging to John Sheffield, of York, was on the river opposite the abbey, when a bargee, a native of Benningborough, called William Mynne, fell some how or other into the water. Assistance was at hand,

and William of Rokeby, Thomas of Appleton, Robert, the servant of the bursar of St. Mary's, John Stell, William Sawyer, and William of Gatenby, helped to pull the poor fellow out of the water, or saw others do it. He had still some life left in him, and instead of putting into practice some of those simple rules which, through the agency of the Humane Society, are now universally known, his rescuers hurried with their burden up Marygate, and going with it up the steps into the chapel, laid it down before the image of the Blessed Virgin, hoping, as the narrator says, that she would rekindle in the poor creature, miraculously, the all-but extinguished light. It was all in vain. He expired at her feet as soon as he was laid down, and was commended to the mercy of God. The story is a pathetic one. The monks of St. Mary's took up the body and interred it *intuitu caritatis* !

The chapel fell at the dissolution of monasteries, and its subsequent history is unknown. Some portions of the walls may be still seen. It is remarkable that Drake, in his account of Marygate, never even alludes to its existence.

Wiltshire Philosophical Society.

ANNUAL REPORT

FOR

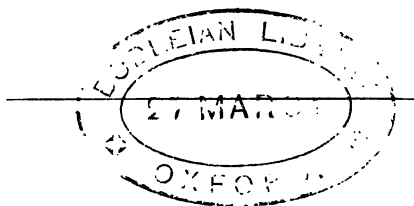
MDCCCLXXX.



ANNUAL REPORT
OF THE COUNCIL
OF THE
YORKSHIRE
PHILOSOPHICAL SOCIETY
FOR
MDCCCLXXX.

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 1st, 1881.



YORK:
J. SOTHERAN, BOOKSELLER, CONEY STREET.

1881.

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Yorkshire Philosophical Society.

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H. R. H. THE DUKE OF CONNAUGHT, K.G.

HIS GRACE THE ARCHBISHOP OF YORK, F.R.S.

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<i>consisting of</i>	

KEEPER OF THE MUSEUM.

WALTER KEEPING, M.A., F.G.S.

REPORT OF THE COUNCIL

OF THE

YORKSHIRE PHILOSOPHICAL SOCIETY,

Read at the Annual Meeting on

FEBRUARY 1ST, 1881.

In presenting their Report for the year 1880, the Council of the Yorkshire Philosophical Society congratulate the members on the prosperous state of the Museum in regard to finances and science. During the last four years an extraordinary expenditure has been incurred, which leaves a considerable sum on the debit side of the balance sheet. This the Council, following the usual order in these Reports, will now explain, and then proceed to report on the various scientific departments of the Museum. The Council have every confidence that when this Report has been concluded, the members of the Society will be of an unanimous opinion that its affairs, its honour, and its interests have been well cared for by the Executive, who now render this account. It will be necessary, however, in order fully to understand the scope of this Report, to refer to that of the year 1876 and the four intervening years.

In the year 1876 the Report presented a balance sheet of average receipts and expenditure; but in the following year, 1877, a debt of £650 2s. 3d., the balance due on the Lodge building account, was taken into the general account. This sum formed the nucleus of an increasing debt, which now amounts to a considerable sum. The members, however, must be reminded that in the four intervening years, from 1876 to 1880, an extraordinary expenditure was rendered necessary by special circumstances, not likely to occur again during the lifetime of the present generation, which amounted to the

large sum of upwards of £2,100 ; whilst the present debt does not reach two-thirds of that sum.

This debt, £1,378 5s. 9d., would have been reduced considerably during the present year but for the expenditure for new cases and alterations required for the display of Mr. W. Reed's munificent donation, amounting in the whole to £667 14s. 9d., of which large sum £150 only can be charged as ordinary expenditure.

During the four years referred to the following expenditure was incurred :—

	£	s.	d.
In 1877-8 the New Roof to the Museum and the large room in which the Ethno- logical Museum is displayed cost ..	413.	2.	5
In 1878 the Alterations in the Geological Room cost the further sum of	198.	2.	9
The Inclosure of the Acre of New Ground added to the Gardens	263.	11.	10
The purchase of Antiquities	104.	12.	7
If to these items be added the debt on the Lodge Account	650.	2.	3
And the extraordinary expenditure of the present year, for cases and alterations for the Geological Museum, £667. 14. 9			
Less 150. 0. 0	517.	14.	9

The Total amount of extraordinary
expenditure for the above period will be £2,147. 6. 7

When the members are further reminded that these items of expenditure have been incurred for improvements and additions to the real estate of the Society, and the collections in the Museum, which have increased the value of the Society's property far beyond the sum named, the Council cannot but believe that the balance sheet, when further treated of at the close of this Report, will be found highly satisfactory.

It may be stated before this part of the Report is closed that the wave of agricultural and commercial depression, which seems to have pervaded the whole of Europe, has had a material

effect in reducing the average amount received at the gate for admission money. This year the gate-money amounts to £272. 8s. 6d., as against £368. 13s. 6d. of the previous year.

In the autumn of last year, Dr. Purves, the keeper of the Museum, resigned his office, having been appointed one of the staff on the Government Survey in Belgium.

Your Council at once took steps to supply his place, and after full enquiry and investigation into the testimonials of the gentlemen who sought the office, they elected Mr. Walter Keeping, M.A., of the University of Cambridge, to the vacant office. Mr. Keeping's testimonials were of the highest order. He took a first class in the Scientific Tripos in the University, and for some time was an officer in the Cambridge Museum, where he acquired a large and extensive experience in the arrangement and naming of fossils. He asked, however, a larger salary than had been allowed to his predecessor. The Council felt bound to consider the wishes of our great benefactor, Mr. Reed, whose colleague in the arrangement of the Geological Museum the new Keeper would become, and at his instance and special request the following arrangement was made. The salary of the new Keeper was fixed at £200 a year, the ordinary salary, but the Council determined that as soon as the tenant vacated St. Mary's Lodge, it should be restored to the purpose for which it was formerly used and become the residence of the new Keeper of the Museum; and that the garden now attached to the house should be added to the Museum grounds, which will effect a great improvement. These terms Mr. Keeping accepted. The Council directed a notice to quit to be served on the tenant, and the house will be vacated on Lady Day next, when Mr. Keeping will at once enter upon his residence. In the meantime, the Council undertook to pay Mr. Keeping at the rate of £40 a year for house-rent until the 6th April.

It is true that a small loss of income will accrue from this arrangement, but the Council felt that this was the best course to adopt under the circumstances, as for reasons which need not be further explained, the residence of the chief officer of the Museum on the Society's premises was greatly needed, and will be of great benefit to the Society. In the view of the ensuing meeting

of the British Association at York this year, the members both of the Association and the Society will find this arrangement of great use. The Council had peculiar satisfaction in acceding to this arrangement, as Mr. William Reed, who has again generously enriched our Museum with a collection which may be justly termed one of the great geological treasures of Yorkshire, strongly advised this course; but the advantages of this arrangement will be obvious to the members.

Mr. Keeping commenced his duties at the Museum in September last, and the manner in which these have been performed, and the present state of the collections, have been highly satisfactory to the Council, who congratulate the members on the acquisition of so valuable an officer. When it is remembered that the collections on which Mr. Keeping is now engaged consist of upwards of 100,000 specimens in number, that each specimen has to be carefully tabulated and stratigraphically arranged, some idea may be formed of the vast amount of labour and scientific skill which will have to be expended before the arrangement of the collection is completed.

Nearly two years ago your Secretary was invited by the Lord Mayor to accompany his Lordship and the Town Clerk to Sheffield to support an invitation to the British Association to visit York at their fiftieth anniversary, which, as is now well known, will take place here in the autumn of this year. In supporting the invitation your Secretary informed the President and Members of Committee that no persons would so heartily welcome the Members of the Association to York as those who now constitute the Society, from whose Museum, in the year 1831, the Association went forth; a welcome which the Council are sure every member now present will as heartily join in giving when the time arrives.

It may not be out of place briefly to state a few facts respecting the foundation of the British Association and its connexion with this Society.

The original suggestion as to the formation of a scientific society appears to have been made to the Council by Dr. Brewster, afterwards so well known as Sir David Brewster, in

April, 1831. He appears to have taken the idea from the fact that societies consisting of meetings of men of science annually took place in Germany. It was, however, to the high powers of administration, and to the learning and energy of the late Rev. William Vernon Harcourt, the son of the then Archbishop of York, a great benefactor to this city, and the founder of this Museum, that the Association owes its formation. On the 27th of September, 1831, Mr. Harcourt, in an address of the utmost ability, gave his exposition of the objects and plan of the Association. This address will well repay a perusal by all interested in the history of the Association.

Mr. Harcourt, in this address, drew attention to the fact that in Lord Bacon's new Atlantis was to be found the first idea bearing upon similar associations. Bacon, in his interesting romance, has drawn a picture of a society organized with a view to the purposes of scientific co-operation. At the close of the meeting, Mr. Murchison, afterwards known as the great geologist, made the following remarks in this hall, which may be recalled with pleasure :—

“He explained the motives which first induced the original promoters of the meeting to select the City of York for their first assembly.” He then went on to say, “To this city, as the cradle of the Association, they should ever look back with gratitude, and whether they met hereafter on the banks of the Isis, the Cam, or the Forth, to this spot, to this beautiful building, they would still fondly revert, and hail with delight the period at which in their gyration they should return to this point of their first attraction.”

The additions to the GEOLOGICAL DEPARTMENT have been numerous and important.

Besides the large collection of fossils formed by the late Mr. E. Wood, of Richmond, various other specimens that were needed in the collection have been added through the liberality of Mr. Reed, the honorary curator.

We are indebted to our late esteemed honorary treasurer, Mr. William Gray, for a number of interesting fossils from various geological horizons; also to Mr. Fielden Thorpe, of

Blossom Street, for a very complete specimen of *Ichthyosaurus tenuirostris* from the Lias of Street, Somersetshire; to the Rev. W. C. Hey for a series of Portlandian fossils; to Mr. J. Brown, of Monkgate, for a fossil fish from the Whitby Lias; to Mr. Cameron, of H. M. Geological Survey, for specimens of Yorkshire Rhaetic fossils; and to Mr. J. F. Walker, M.A., for various Brachiopoda and other fossils from the secondary formations.

Much progress has been made in the arrangement of the Museum during the last twelve months. The collection of Yorkshire fossils, from the Chalk to the Cornbrash, inclusive, has been arranged in the cases; and the remaining space allotted to this collection is now undergoing alterations preparatory to the work being resumed and completed.

During the last four months we have been engaged in the arrangement of the general collection of fossils in the galleries of the east room, and in this we have advanced as far as the Lower Oolites. The space now available in the Museum is insufficient for the display of much more of the collection.

The work of arranging has, of late, been interrupted on account of the acquisition of the geological collection formerly belonging to Mr. E. Wood, of Richmond. Much time was spent in the packing at Richmond and the unpacking and storing of the specimens in our Museum. This collection will be incorporated with the other fossils in their proper places, in due course, as the arrangements proceed.

It is again, as on a former occasion, to the bounty of our constant helper, Mr. William Reed, F.G.S., Honorary Curator of Geology, that the great advance in the growth of our Museum during the past twelve months is due.

Two years ago it was the pleasant duty of the Council to inform the members of the gift of Mr. Reed's great collection of fossils—a collection of more than 100,000 specimens of the rarest and choicest character; and now Mr. Reed has again, at great expense, enriched our Museum by the purchase and presentation of the geological collection formed by the late Mr. Ed. Wood, F.G.S., of Richmond, Yorkshire.

This collection, consisting of above 10,000 specimens, is

particularly valuable to us from its richness in the fossils of those geological groups in which Mr. Reed's original cabinets and the old Museum collection were most deficient, namely in the old Red Sandstone, Carboniferous, and Permian formations.

Amongst the greatest treasures for which Mr. Wood's Museum has obtained world-wide celebrity are the *Crinoids*, or Sea Lilies, especially the *Woodocrinus* and the *Brachiopoda*; and it is also of special scientific value as containing many type specimens. The possession of these gives to our Museum much importance, attracting of necessity the attention of scientific workers.

In the North of England, York and Richmond have been, of late years, the principal attractions for investigators of the past history of organic life, the latter because of the presence of Mr. Wood's collection, and the former for that of Mr. William Reed, as well as our own Museum. All these, by the princely gift of Mr. Reed, are now united in the Society's Museum.

Nor must we value as an unimportant part of our Honorary Curator's benefactions his untiring zeal and labour now devoted to the work of arranging the collections. That same energy and extreme carefulness, combined with tasteful discrimination which have left their abiding mark in his collection of fossils, are now employed to the great advantage of the Society's Museum in the arrangement of the specimens.

These arrangements, together with that of the other departments of the Museum, are now satisfactorily progressing, and before the next report is read in this hall we hope to possess a geological collection, well exhibited and arranged, second only in importance to the museums of the Metropolis and the Universities.

The Curator of ANTIQUITIES reports:—

The additions to the Antiquarian Department of the Museum during the past year have been numerous and varied. In Roman curiosities York itself has yielded a fine gold ring set with an engraved carnelian, a bronze vessel, ten urns, and many smaller remains of less interest. The greatest discovery, however, of the year has been that in the garden of St. Mary's

Convent, to which the attention of the members of the Yorkshire Philosophical Society has been already directed. It is to be hoped that these choice remains, which consist of three inscribed stones and a statue, will eventually find their way into our Museum. Through the kindness of Messrs. Foster, the owners of the Egton Estate, a rudely inscribed stone which was discovered at the beginning of this century at Hazlehead, near Whitby, has been presented to us. The letters, most unfortunately, have been considerably injured, and no one but an Œdipus can decipher them. We have also acquired by purchase during the year above 170 Roman silver coins, which were discovered in 1848 at Boston Spa. The imperial coins in the series are remarkably fine, and as it ends with Hadrian we may assume that the treasure was concealed while he wore the purple. The Curator has also to report many additions to the British, Anglian, and Mediæval Departments in the antiquarian collection which will greatly enhance the interest with which it is regarded.

During the past year some important changes have been made in the Hospitium. The roof, which was in a somewhat dangerous condition, has been made secure, and some alterations have been made in the arrangement of the collections. The Egyptian antiquities, a very fine series of Anglian urns which the Society has recently acquired, and the smaller Mediæval and more recent antiquities have still to be shown in the ethnological room in the Museum, and new cases are required for their exhibition.

The Curator has to announce the loan of a considerable quantity of ancient pottery from Cyprus and Crete, which has been very kindly sent by Mr. T. B. Sandwith, C.B., H.B.M.'s Consul at Crete, at the suggestion of Mr. John Holmes, of Roundhay, near Leeds. This collection is a very valuable one, and will soon be arranged in the theatre of the Museum.

The Honorary Curator of BOTANY reports:—The British and Foreign Herbaria are in a good state of preservation. W. H. Rudston Read, Esq. has kindly presented to the Society a large number of plants.

CONCHOLOGY.—*British Shells*.—A considerable amount of attention has been given to the land and freshwater shells. All inferior specimens, and almost all specimens to which no locality was attached, have been replaced by finer examples, obtained, whenever possible, from the neighbourhood of York. This part of the collection is now to a large extent local, and is fairly worthy of what is, perhaps, the best district for freshwater shells in the United Kingdom. The most interesting additions are *Sphaerium ovale*, from the Foss, *Planorbis dilatatus* from Manchester, and a gigantic example of *Anodonta cygnea* from Fairfield.

The Marine Shells have, to a smaller extent, been treated in the same way as the land and freshwater. A considerable number of unlocalized specimens have given way to specimens from the Yorkshire Coast, the rich beach of Redcar supplying the greater number. The Reed Collection was, however, nearly complete, and the specimens as a rule are very fine. The genus *Pecten* will be found to contain a number of gems, which have only lately been exhibited in the case.

It is to be regretted that the British Shells are exhibited in so cramped a space, and at an angle which renders their position very dangerous.

Foreign Shells.—After considerable deliberation, it was decided that, in default of sufficient room, a small but choice selection should be made from the foreign shells, and exhibited in the upper part of the central case of the skeleton room, until suitable space could be gained for arranging the whole collection.

The Curator, on commencing this work, found the Museum in possession of a vast number of foreign shells—truly a “rudis indigesta que moles”—stowed away in drawers and cabinets. Few were named (as the old names were all jumbled together), and none, or hardly any, were localised.

Many of the specimens, however, are of the greatest beauty, and of considerable rarity. We are in possession of the making of a good collection, when room can be found; although much work will be required, as, owing to the way in which the collection has been got together, we find perhaps twenty specimens of one species, while whole groups are altogether

wanting. This may be remedied by effecting exchanges. The present selection aims at being little more than generic; there are neither the books nor the time for the identification of many of the species. Nevertheless, it will be broadly instructive and more useful for general instruction than a fuller series. The absence of localities is much to be deplored. The species recently added belong to groups which the old collections scarcely represented, and are valuable from being precisely localised. They belong strictly to the genera *Helix*, *Nerita*, *Cerithium*, and *Cyclostoma*.

It is to be hoped that, as soon as possible, flat cases may be provided for the foreign shells, as they cannot be safely exhibited at an angle, while all the larger species are excluded by their size and weight.

COMPARATIVE ANATOMY.—The Skeletons have been cleaned, and their position and mounting attended to. The most important part of this work was on the skeletons of British Birds.

A large number of bones, skulls, and stuffed animals, including several fish skins and stuffed fishes, mostly British or from Jamaica, which have long been hidden in the store-rooms, have been arranged in their places in the Museum.

A large and valuable collection of skulls and other osteological remains, the gift of W. Reed, Esq., F.G.S., has been incorporated with the collection. Thanks are due to this gentleman for the supervision of the rearrangement mentioned above.

The cases have been cleaned, and painted inside a pale tint, which contrasts well with the colour of the contents; and the collection only requires re-labelling and the addition of descriptive tablets to render its arrangements complete.

MINERALOGY.—The Curator of Mineralogy reports that no alterations or additions have been made during the past year. It is in contemplation to relabel and, to a certain extent, to rearrange the collection.

METEOROLOGICAL REPORT.

The mean height of the Mercurial Column, duly corrected, for the year 1880 was 29·962. The highest reading was 30·665 on January 7th at 6 p.m., and the lowest 28·466 on November 16th at 2 p.m. An exceptionally low pressure was maintained throughout the 16th of November, accompanied by moderate temperature and rapid change of wind. Weather cloudy. See table:—

BAROMETRIC PRESSURES

ON NOVEMBER 15TH AND 16TH, 1880.

Nov. 15	9 a.m.	29·695	Wind N.N.E.	Dry Bulb	30·8
„ 16	9 a.m.	28·685	„ S.S.E.	„	42
	12 p.m.	28·522	„ S.	„	47
	1 p.m.	28·478	„ S.	„	46
	2 p.m.	28·466	„ W.S.W.	„	46
	3 p.m.	28·467	„ W.S.W.	„	41·5
	4 p.m.	28·487	„ N.N.W.	„	39
	6 p.m.	28·557	„ N.N.W.	„	41
	9 p.m.	28·796	„ N.	„	39

This is the lowest barometric pressure recorded during the last ten years, except one day, in 1876, when it was 28·439.

High pressures prevailed from January 3rd to January 15th, the highest being 30·665 on January 7th at 9 p.m., and 30·659 on the 12th at the same hour. The weather of this period was cold and cloudy; wind S.S.W. Pressure afterwards oscillated.

The range of pressure during the year was 2·199. The mean shade temperature of the year was 48·1°, which is above the average of the last ten years. The maximum attained was 80·5°, and the minimum 19°, giving a range of 61·5°. The month of September was hot, the highest temperature being 80° on the 3rd, and 80·5° on the 4th, and the lowest maximum during the month was 58°. The lowest temperature this month was 42° on September 19th. The mean temperature of September was, however, below that of August, the former being 58·7°, and the latter 61·8°. The hottest days of August were the 10th (77°), 11th (79°), and the 12th (77°).

The coldest month was January, whose mean temperature

was 35.1° , and the average maximum 39° . On its warmest day, the 16th, the maximum recorder stood at 47° , and on the coldest day, the 19th, it fell to 20° . The coldest day of the year was, however, in November, the temperature being 19° on the 21st of this month at 8 a.m. The minimum thermometer continued below 32° from the 9th to the 31st of January.

The Rainfall for the year amounts altogether to 30.93 inches, which is 7.91 in excess of last year, and above the average. The number of days in which rain fell is 179. July was very wet, its rainfall amounting to 5.21 inches. An unusually heavy fall of rain occurred on the 27th of October, namely, 1.50 inches; and on three other days of the year, March 31st, May 26th, and September 11th the rainfall exceeded one inch.

On Cherry Hill, York, the observations taken by the Sheriff, Mr. Richard Thompson, shew a rainfall of 30.36; and at Old Malton, Mr. H. Hartley kindly supplies us with his observations, shewing a total of 30.50 inches for the year.

Of the winds, we find those from a northerly quarter were frequent, and the actual north wind days number $46\frac{1}{2}$. There has been less east wind than of late years, the south (55 days) and west ($75\frac{1}{2}$ days) being more prevalent.

SUMMARY OF THE NORTHERLY AND SOUTHERLY WINDS
FOR THE LAST FOUR YEARS.

	N. to E.—E. to S.				S. to W.—W. to N.			
1877	..	111	days	.. .. .	.. .. .	254	days.	
1878	..	138	„	.. .. .	.. .. .	227	„	
1879	..	170	„	.. .. .	.. .. .	195	„	
1880	..	144	„	.. .. .	.. .. .	218	„	

The year 1880 is very near the mean of ten years given by Professor Phillips—viz., 131 N. to E.—E. to S., and 227 S. to W.—W. to N.

The River Ouse was swollen to a height of $12\frac{1}{2}$ feet above its Summer level on the 29th October; and on two other days, namely, October 30th and December 24th, it rose up to or above 12 feet. Also, on five other days of the year—viz., October 31st, November 1st, November 15th, December 25th, and December 30th it exceeded 10 feet.

From January to June the river level was very uniform, at about Summer level, rarely exceeding three feet above Summer height. The principal variations were an excess of 4 to $8\frac{1}{4}$ feet at the end of February and beginning of March, and another excess of similar amount on the 15th, 16th, and 29th July. In the latter half of August and beginning of September the river again flowed very evenly at Summer level; but in October came the floods of the 29th to the 31st, at a maximum height of $12\frac{1}{2}$ feet.

During November and December the river was very full, never once falling to Summer level, but reaching flood height on November 1st, 2nd, 14th, 15th, and 16th, and December 24th, 25th, 30th, and 31st.

METEOROLOGICAL REGISTER, YORK, 1880.

Based on observations taken at the Museum at York at 9 a.m. and 9 p.m. each day, local time. The self-registering thermometers were read at 9 p.m., and entered to the day on which read, while the Rainfall measured at 9 a.m. has been thrown back to the *preceding* day.

BAROMETER.				RAIN.		THERMOMETER.				
Month.	Highest.	Lowest.	Mean.	Inches.	Days.	Average Maximum.	Average Minimum.	Mean Temp.	Highest.	Lowest.
Jan.	30.659	29.678	30.343	0.29	7	39.8	30.3	35.1	57.0	20.0
Feb.	30.368	28.876	29.698	1.79	18	47.8	35.1	41.5	55.0	26.0
Mar.	30.577	28.958	30.109	2.07	9	49.8	34.4	42.1	58.0	27.0
April	30.532	29.208	29.864	2.30	19	54.5	39.1	46.8	63.0	29.0
May	30.434	29.611	30.119	2.12	11	59.1	40.9	50.0	68.0	32.0
June	30.338	29.534	29.922	1.55	16	64.1	48.3	56.2	74.0	36.0
July	30.145	29.491	29.857	5.21	22	65.2	52.5	58.9	71.4	45.0
Aug.	30.315	29.336	30.043	1.66	10	69.5	54.0	61.8	79.0	46.5
Sept.	30.507	29.264	29.948	4.57	16	66.6	50.8	58.7	80.5	42.4
Oct.	30.405	28.807	29.922	3.82	15	51.4	37.8	44.6	63.0	24.0
Nov.	30.511	28.685	29.885	2.33	16	47.9	35.3	41.6	59.0	19.0
Dec.	30.578	28.868	29.832	3.22	20	44.5	35.0	39.8	54.5	25.0
Year	30.659	28.685	29.962	30.93	179	55.0	41.1	48.1	80.5	19.0

RAINFALL, 1880.

Month.	Total Depth.	Greatest Fall in 24 Hours.		Days on which -01 or more fell.	At Cherry Hill, York.	At Old Malton.
		Inches.	Depth.			
Jan.	0·29	·14	15	7	·65	·34
Feb.	1·79	·60	16	18	1·68	2·19
Mar.	2·07	1·06	31	9	2·05	2·28
April	2·30	·70	3	19	2·30	2·04
May	2·12	1·11	26	11	2·08	2·23
June	1·55	·37	8	16	1·45	2·33
July	5·21	·95	26	22	5·16	4·56
Aug.	1·66	·58	7	10	1·54	1·15
Sept.	4·57	1·35	11	16	4·21	4·11
Oct.	3·82	1·50	27	15	3·69	4·14
Nov.	2·33	·61	17	16	2·37	2·03
Dec.	3·22	·82	29	20	3·18	3·10
Year	30·93	1·50	Oct. 27	179	30·36	30·50

YORK, 1880.

WIND SUMMARY.—NUMBER OF OBSERVATIONS UNDER EACH POINT.

MONTHS.	NORTH	N.E.	E.N.E.	EAST	E.S.E.	S.E.	S.S.E.	SOUTH	S.S.W.	S.W.	W.S.W.	WEST	W.N.W.	N.W.	N.N.W.	Calm.	Variable.
January ..	6	2	1	1	0	1	1	3	7	3	2	8	3	0	6	1	
February ..	1	1	0	2	1	2	3	17	3	2	6	11	3	3	2	0	
March ..	3	2	5	7	19	1	3	7	4	0	1	9	0	0	0	0	
April ..	10	2	6	2	4	2	0	13	3	2	2	10	0	2	1	0	
May ..	11	2	8	4	7	1	0	7	2	3	0	11	1	1	3	0	
June ..	12	0	6	2	6	1	3	4	1	6	2	10	1	4	2	0	
July ..	2	2	3	1	4	2	1	13	0	6	2	19	0	2	2	0	
August ..	8	6	11	6	8	0	1	5	0	2	0	7	2	3	2	0	
September ..	4	0	0	1	1	2	0	10	3	6	6	18	1	3	1	2	
October ..	16	4	3	6	2	0	0	1	1	0	2	12	4	2	6	2	
November ..	12	1	0	1	1	0	0	11	6	1	8	11	2	1	4	0	
December ..	6	2	0	0	0	0	4	4	1	5	2	25	3	4	3	3	
Sums ..	93	24	44	31	54	11	9	22	31	36	33	161	20	26	30	8	

Thirteen members have been lost to the Society by death during the past year, and sixteen members, six lady subscribers, and five associates have resigned; whilst twenty new members, seven lady subscribers, five associates, and five temporary subscribers have been added to the Society. Among those whose loss the Society mourn are the Honourable and Very Reverend Dr. Duncombe, late Dean of York, one of our Vice-Presidents; and William Gray, Esquire, Honorary Treasurer of the Society.

The Honourable and Very Reverend Augustus Duncombe, D.D., was the fourth son of Charles, first Lord Feversham. Dr. Duncombe was educated at Worcester College, Oxford, and graduated as B.A. in the year 1836. In the two following years he was ordained Deacon and Priest by Archbishop Harcourt, and was afterwards admitted to the Rectory of Kirby Misperton, in this diocese. In 1841 he was promoted by the same Archbishop to the Prebend of Bole, in the Cathedral Church of York, a dignity which he held until his further promotion to the Deanery of York, in the year 1858, by the Crown, on the nomination of Lord Derby, then Premier.

It will be impossible in this brief notice of the Dean's life to do more than to refer to the fact how earnestly he sought to discharge the duties of his high office, and with what zeal he laboured to provide for the spiritual wants of the citizens of York by additional services in the Cathedral and by other means. The late Dean was a munificent benefactor to the fabric of the Cathedral, and during his residence amongst us always took a pleasure in promoting every institution in our City which had for its object either the alleviation of human suffering or the extension of sound learning.

His connexion with this Society commenced in the year 1859, when he became a member of our Council, and subsequently he was nominated one of the Vice-Presidents of the Society. Until a few weeks before the close of his life he continued to take an active part in the administration of the affairs of the Society. The Dean died at York on the 26th day of January, 1880, after a short illness.

Mr. William Gray, for many years our Honorary Treasurer, was the oldest member of our Society. The son of a well-

known and highly respected York family, he was brought up in his father's office as a solicitor, and at the time of his death was the father of the profession in this city. During a long and prosperous life, it was his lot to fill nearly every honourable office open to his profession. For many years previous to his death he had discharged the onerous and important duties of Under Sheriff of this great county. In the year 1844 the Municipal Corporation of York testified their respect to his worth by electing him to the highest civic office, that of Lord Mayor of this City. In all the relations of life, whether as a professional man or as a citizen, Mr. Gray won the esteem and respect of all. He was ever ready to lend a helping hand to others, and did not spare himself in any labours which had for their object the promotion of science, the improvement of his native city, and the welfare of the citizens. Mr. Gray was prominently associated with the Yorkshire Philosophical Society almost from the date of its formation. He became one of its members in 1827, and in the following year was appointed one of its Honorary Secretaries, an office which he held until the death of his father, when he became a member of the Council of the Society, in the management of which he took an active part. In 1855 he succeeded Mr. T. Meynell as Treasurer, which post he held up to the time of his death, when he was the senior member of the Society. Amongst the many branches of study to which Mr. Gray gave his attention was that of Geology, and he was intimately associated with the late Professor Phillips in the promotion of this science, and the acquisition of the magnificent collections in the York Museum. He was a Fellow of the Geological and Astronomical Societies, and possessed an intimate knowledge of the strata of our wide county. In the sciences of Astronomy and Meteorology he was also no mean adept, and spent much time in practical astronomical investigations in his own Observatory, where he had caused to be erected a powerful equatorial telescope. In 1836, with a party of scientific friends, he visited a remote part of Scotland for the purpose of observing a solar eclipse; and, about twenty years later, he visited Norway especially with the view of observing a total eclipse of the sun, taking with him a

powerful instrument for the purpose. He was also a not unfrequent contributor to the Transactions of the Royal Astronomical Society, of which he was a Fellow. By his death the Yorkshire Philosophical Society has lost such a warm and active friend and benefactor as it will be difficult to replace.

Of the British Association, whose jubilee is to be celebrated at York next year, Mr. Gray was one of the first founders, and was one of its joint-secretaries with Professor Phillips; and only a few weeks before his death he had put himself in communication with the Secretary of this Society with reference to the contemplated visit of the British Association to this city, offering some practical and valuable suggestions for securing the success of the meeting.

The Council propose for election as Vice-President, in the room of the late Dean of York, the Hon. Payan Dawnay; and as members of Council, the Very Rev. the Dean of York, Dr. Shann, George Oldfield, and Mr. Alderman Terry, in room of the Rev. R. Daniel, Alfred Spence, William Lewin Newman, and James Melrose, who retire by rotation.

**THE TREASURER IN ACCOUNT WITH
THE YORKSHIRE PHILOSOPHICAL SOCIETY
FOR THE YEAR 1880.**

Dr.	INCOME.					
1880.	£. s. d.			£. s. d.		
<i>Annual Subscriptions, &c.:</i>						
Members	708	1	0			
Lady Subscribers	72	0	0			
Associates	20	0	0			
Arrears	5	0	0			
	<hr/>			805	1	0

<i>Admission Fees of New Members:</i>						
Paid in Full	21	0	0			
Paid by Instalments	37	0	0			
				58	0	0
Keys of the Gates	63	5	0			
Temporary Subscribers	5	0	0			
				931	6	0

<i>Rents:</i>						
St. Mary's Lodge	53	17	1			
Bootham and Marygate						
Towers	23	10	0			
Swimming Bath	40	0	0			
Boat Yard and for Hedge						
Cutting	5	8	0			
Water Works Co.	0	1	0			
				122	16	1
Gate Money	272	8	6			
Sale of Catalogues and Photographs	4	13	0			
Use of Tent	42	12	7			
Meteorological Reports ..	15	12	0			
Profits of Whitsuntide Admissions..	5	16	10			
				1395	5	1

Excess of Expenditure 31st Dec., 1880	459	2	8
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£1854 7 9

Permanent Debt:

Yorkshire Insurance Company	1900	0	0
Due to Two Members, £50 each	100	0	0
	2000	0	0
Balance due to Treasurer, 31st Dec., 1879	919	3	1
Excess of Expenditure for 1880	459	2	8
	1378	5	9
	£3378	5	9

EXPENDITURE.

1880.	£.	s.	d.	£.	s.	d.
Crown Rent	1	0	0			
Corporation Rent	19	10	10			
Water Rent	3	12	6			
Rates and Taxes	14	19	8			
Insurance	5	11	6			
<i>Salaries and Wages:</i>						
Dr Purves, proportion to 31st Aug., 1880	133	6	8			
Mr. Keeping from 1st Sept. to 31st. Dec., 1880	80	0	0			
Clerk	25	0	0			
J. Davison (Pension)	26	0	0			
J. Fielden	70	4	0			
Miss Baines, Lodge Keeper	39	0	0			
Attendant, Museum	46	16	0			
Do., Hospitium	26	0	0			
Gardeners Wages	125	2	0			
				571	8	8

Yorkshire Insurance Company, interest on loan	74	2	0
Interest and Commission to Bankers	42	13	6
<i>General Expenses, Repairs, Alterations, &c.</i>			
New Cases for Geological Specimens as per Contract, viz.—			
Rookledge, Joiner	265	0	0
Hartley, Glazier, &c	87	0	0
Mr. Gerard's Charge for arranging Osteological Collection	54	16	6
General Repairs and Additions, &c.	260	18	3
	667	14	9
Hospitium	68	13	2
Estate and Observatory	31	11	9
	767	19	8

<i>Gardens and Greenhouses, &c.:</i>			
General Expenses & Repairs ..	55	7	2
Seeds	5	0	0
Coals and Coke	8	4	7
	68	11	9
Library, Books, and Binding, &c.	39	6	0
<i>Miscellaneous:</i>			
Printing and Stationery	38	13	4
Printing Reports and Copies of Laws	16	4	0
Coals, Gas, and Coke	39	4	7
Expenses of Military Bands	21	0	6
Antiquities	46	15	1
Repairs of Tent	15	12	0
Travelling Expenses of Dr. Purves and Mr. Keeping	5	19	2
Postages of Communications to Members	12	3	0
Sundry General Expenses	34	8	0
	52	10	2
Meteorological Reports and Observations	15	12	0

£1854 7 9

Permanent Debt:

Yorkshire Insurance Company	1900	0	0
Due to Two Members, £50 each	100	0	0
	2000	0	0
Balance due to the Treasurer, 31st Dec., 1880	1378	5	9

£3378 5 9

Audited and found correct, York, January 27th, 1881,
E. GRAY, Treasurer. F. L. MAWDESLEY.

NEW MEMBERS.

Adams, James.
 Burton, John, *Clifton*.
 Carnegie, A. St. C., *Union Bank*.
 Creyke, Ralph, M.P., *Rawcliffe Hall*.
 Field, General, *St. Leonards*.
 Fleming, Rev. Canon.
 Gough, Thos. B. So., 20, *De Grey Street*.
 Hey, Rev. W. C., *Portland Street*.
 Jones, J. E., *St. Mary's*.
 Purey-Cust, The Very Rev. A. P., *The Deanery*.
 Reid, A. S., *Lord Mayor's Walk*.
 Stubbs, W. J., *The Limes, Clifton*.
 Simpson, Henry, *Holgate*.
 Stephenson, Rev. C. 2, *Bootham Terrace*.
 Spencer, Major, *Annerley Park, Annerley, Surrey*.
 Todd, Wm., *Foss Bridge*.
 Toovey, Rev. H., *Grosvenor Terrace*.
 Willis, General, *Station Hotel*.
 Walker, J. S., *Bootham*.

LADY SUBSCRIBERS.

Davis, Mrs., 39, *Bootham*.
 Fairbairn, Lady, 1, *Clifton Terrace*.
 Monkman, Mrs., 13, *St. John Street*.
 Procter, Miss, 15, *St. John Street*.
 Palmer, Mrs., *Goodramgate*.
 Richardson, Miss, 40, *Bootham*.

ASSOCIATES.

Bright, C. H. C., *De Grey Rooms*.
 Knott, George, *Lendal*.
 Lees, Rev. A. H. P., *Minster Yard*.
 Lindbergh, T. H., *Beech House, Mount*.
 Roberts, E., 22, *Portland Street*.
 Spencer, H. E., *Lord Mayor's Walk*.

RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEBRUARY 1ST, 1881.

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1. That the Report of the Council now read be adopted and printed for circulation amongst the Members, Lady Subscribers, and Associates of the Society.

2. That the thanks of the Society be given to the Members of Council retiring from office, also to the Treasurer, Secretary, and Curators for their valuable services; and that authority be given to the Council to give admission to the Public to the Museum on Whit-Monday and Tuesday, under the same regulations as last year. Also that the same privilege of admission to the Museum be granted to the members of the British Association, or other learned Societies, during their stay in York.

3. That the thanks of the Meeting be given to the Chairman.

DONATIONS TO THE MUSEUM AND LIBRARY.

LIBRARY.

BOOKS PRESENTED.	DONORS.
Allen, J. A., The History of N. American Pinnipedes	The United States Government.
Associated Architectural Societies' Reports and Papers	The Associated Architectural Society.
Atti della R. Accademia dei Lincei, 1879.	The Academy.
Barrande, du maintien de la Nomenclature etablie par M. Murchison	The Author.
Barrande, Defense des Colonies	The Author.
„ Les Brachiopodes	Do.
„ Les Cephalopodes	Do.
„ Crustace's divers, et poissons des depôts Silurienne de la Bohême ..	Do.
Bristow's Chart of British Strata	Mr. W. Reed, F.G.S.
Do. do. with Notes by R. Etheridge, F.R.S.....	Ditto.
British Association, Report for 1879	The Association.
Bulletin of the United States Geological and Geographical Surveys of the Territories, vol. v., No. 4	The United States Government.
Catalogue of Indian Photographs	The United States Government.
Carpenter et Henschel, Glossarium mediæ et Infimæ Latinitatis, vols. I.—VIII. }	Mr. Wm. Gray.
Clarke, J. G., The great detonating meteor of February 24, 1879	The Author.
Chemical Society, Journal of, for 1880 ..	The Chemical Society.
Davies, R., Walks through the City of York	Rev. Alfred Porter.
Deslongchamps, Le Jura Normand, Livr. I. and II.	M. Endes Deslongchamps.
Deslongchamps, Notes Palæontologiques	Do.
Deslongchamps, Memoires sur les Teleosaurus de l'Epoque Jurassique, du Department du Calvados	Do.

BOOKS PRESENTED.	DONORS.
Deslongchamps, 19 memoirs on Palæontological and Zoological subjects	M. Endes Deslongchamps.
Drawings of the glass cases in the S. Kensington Museum	The Department of Science and Art.
Dugdale's Monasticon Anglicanum, vols. I.—VIII.	Mr. Wm. Gray.
Edinburgh Royal Society, Proceedings, Session 1878-9	The Society.
Geikie, Prof. A., LL.D., F.R.S., The Carboniferous volcanic rocks of the basin of the Forth	The Author.
Geology of the Henry Mountains	The United States Government.
Geological Survey of the Territories, 6 vols.	Ditto.
Geological Society, The Quarterly Journal of the, together with the Proceedings of the Geological Society, complete from the commencement up to August, 1880.....	Mr. William Gray, V.P. Y.P.S.
Geological Society, Quarterly Journal of, for 1880	The Geological Society.
Geological Survey of India, Memoirs of the, vol. XVII, pts. I. and II.; vol. XV., pt. I.....	The Geological Survey of India.
Ditto. ditto. (Palæontology) ser. X., parts 4 and 5, and XIII., 2...)	Do.
Geological Survey of India, Records of the, vol. XII., part 4; XIII., parts 1, 2.)	Do.
Hebert, Prof., Hon. Mem. Y.P.S., Les mers Anciennes et leurs Rivages dans le Bassin de Paris	The Author.
Do. Ondulations de la craie dans le Nord de la France	Ditto.
Do. Description de deux espèces d' Hemipneustes de la craie superieure des Pyrénées	Ditto.
Do. Les Fossiles de la craie du Nord, all by Prof. Hebert, Hon. Mem. Y.P.S.....	The Author.

BOOKS PRESENTED.	DONORS.
Harrison, W. J., F.G.S., The Geology of the West Riding of Yorkshire }	The Author.
Institution, Royal, of Great Britain, Proceedings, vol. IX., pts. 1, 2, 5, and 6. . }	The Royal Institution.
James's, Col. Sir Henry, Fac-similes of National Manuscripts, vols. I.—IV. . . }	Mr. Wm. Gray, V.P. Y.P.S.
Jordan, Chart of the Geological Strata . .	Mr. Wm. Reed, F.G.S.
Keder, Nummi in Hibernia	Rev. Canon Raine.
Ley, Rev. Clement, Aids to the Study and Forecast of Weather. }	The Meteorological Council.
Linnean Society, Journal of the, Zoology and Botany, current numbers }	Mr. W. H. Rudston Read, V.P., Y.P.S.
Linnean Society, Transactions of, current numbers }	Ditto.
Leeds Literary and Philosophical Society Report, 1880 }	The Society.
Memoirs of the Geological Survey of India, Tertiary and Upper Cretaceous Fauna of Western India, ser. XIV. . . }	The Indian Govern- ment.
Mayer, Joseph, F.S.A., Catalogue of the Gems and Rings in the Collection of . . }	The Author.
Memoir of Thomas Dodd, William Upcott, and George Stubbs. }	Mr. J. Mayer, F.S.A.
Meteorology of the Arctic Regions. }	The Meteorological Council.
Meteorological Council of the Royal Society for the period of 12 months, ending March, 1879, Report of the . . }	Ditto.
Meteorological Congress at Rome, Report of the Proceedings of the Second International }	The Meteorological Council.
Meteorology of Kerguelan Island, Report on the }	The Meteorological Council.
Nathorst, Dr. A. G., Bidrag till Sveriges Fossila Flora }	The Author.
Do. Am Floran i Skones Kolforände Bildungar }	The Author.
Do. Seven Papers on the Fossil Flora of Sweden }	The Author.
Report of the St. Louis Public School Library }	The Library Managers.

BOOKS PRESENTED.	DONORS.
Roach Smithe, The Shorne, Higham, and Cliffe Marshes	The Author.
Roach Smithe, Holwood and Reston	
Sedgwick, Monograph on the Magnesian Limestone	Rev. Canon Raine.
Sedgwick, The Trap Rocks in High Teesdale	
Sedgwick, Geology of the Lake District..	Do.
Smithsonian Report, 1878	The Rev. Canon Raine, M.A.
Sunshine Recorder, Description of.....	The Smithsonian In- stitution.
Surtees Society, The Publications of the, in 70 volumes.....	Mr. G. G. Stokes, F.R.S. Mr. Wm. Gray, V.P. Y.P.S.
Whithy Literary and Philosophical Society, 57th Report.....	The Society.
Warwickshire Field Club, Proceedings of, 1879	The Club.
Wylie, W. M., Esq., M.A., F.S.A., Notice of a Monument at Palanza, N. Italy	Mr. C. Roach Smithe.
Woodward, H. B., Memoir of Samuel Woodward.....	The Author.
Yorkshire College, Calendar of the, 1880-1.....	The Yorkshire College.
Zoological Society, List of Vertebrates in the Garden of.....	The Zoological Society.
Zoological Society, Journal of, June, 1880	The Zoological Society.

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BOOKS PURCHASED.

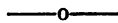
Bischoff, Chemical and Physical Geology.
Chambers's Cyclopedia of English Literature, 2 vols.
Dixon's Geology of Sussex, 2nd Edition.
Fresenius' Chemical Analysis.
Knight's English Cyclopedia, Natural History, 4 vols.
Laurent, Chemical Method.
The Nautical Almanack, 1880-1883.

Rose, *Practical Treatise of Chemical Analysis*.
 Wilson, Dr. G., *Life and Works of Cavendish*.
 Zittel and Schimper, *Handbuch der Paläontologie*.
 Parnell, *Applied Chemistry*.



SERIAL WORKS SUBSCRIBED FOR.

Birds of Asia, by John Gould, F.R.S.
 Natural History of the Tineina, by H. T. Stanton, F.R.S.
 Nautical Almanack.
 Proceedings of the Zoological Society.
 Publications of the Palæontographical Society.
 Publications of the Ray Society.
 Sowerby's *Thesaurus Conchyliorum*.
 London, Edinburgh, and Dublin Philosophical Magazine.
 Annals and Magazine of Natural History.
 Geological Magazine.
 Journal of the British Archæological Association.
 Numismatic Chronicle.
 Memoires de la Société Paléontologique Suisse.
 D'Orbigny's *Paléontologie Française*.
 Geological Record.
 Nature.
 Surtees Society, the Publications of.



MUSEUM.

GEOLOGICAL DEPARTMENT.

Fossil Fish, from the Lias of Whitby...	Mr. J. Brown, Monkgate.
Shale with impressions of <i>Avicula con-</i>	} Mr. A. G. Cameron,
<i>torta</i> , <i>Portl</i> , from Rhaetic Beds, Crosby	
Gate, Northallerton	} F. G. S., H. M. Geo-
	} logical Survey.
A series of Fossil Fruits, from the Lon-	} Mr. W. Reed, F.G.S.
don Clay, Sheppey	
A fine specimen of <i>Ichthyosaurus tenuiro-</i>	} Mr. Fielden Thorpe, of
<i>tris</i> , from the Lias of Street, Somerset.	
	} Blossom Street.
A fine collection of Fossils from the	} Mr. W. Reed, F.G.S.
Coralline Oolite of Yorkshire	

DONORS.

Two associated series of bones of <i>Ichthyosaurus</i> and one of <i>Plesiosaurus</i> , from the Cambridge Greensand; three species of <i>Rhynchonella</i> , from the Cornbrash of Yaxley, near Peter- borough; and three specimens of <i>Terebratula bullata</i> , from the Fullers Earth Rock of Whatley, near Frome.	Mr. J. F. Walker, M.A.
About 300 specimens, mostly Brachio- pods, from the Neocomian deposits at Brickhill, Bedfordshire	Mr. Walter Keeping, M.A.
Twenty specimens of Portlandian Fossils	Rev. W. C. Hey, M.A.
A group of <i>Melonites multipora</i> , from the Carboniferous Limestone of St. Louis, Missouri	Mr. Wm. Reed, F.G.S.
Seven bones of the Great Auk, from Funk Island, N. America	Purchased.
About 100 specimens, mostly Brachiopods and Saurian bones, from the Neocomian of Brickhill, Bedfordshire	Mr. J. F. Walker, M.A.
Twenty-five Fossils of various ages....	Mr. Wm. Gray, F.R.A.S.
Two Flint Celts and a Flint Scraper, from the Brandon Interglacial deposits, Norfolk, also 30 other Flint Imple- ments, mostly of Neolithic type	Purchased.
A Molar Tooth of the Mammoth (<i>Elephas primigenius</i>), from the gravel at Grant- chester.....	Mr. Wm. Reed, F.G.S.
Several species of Brachiopods, from the Cornbrash	Mr. J. F. Walker, M.A.
The collection of Fossils formed by the late Edward Wood, Esq., of Richmond, Yorkshire. The Collection contains over 10,000 specimens—(See special report).	Mr. Wm. Reed, F.G.S.

ZOOLOGY.

DONORS.

A series of Yorkshire Land and Fresh-water Shells, together with a number of the Marine species	Rev. W. Hey, M.A.
Two species of Flying Fish, <i>Exocoetus volitans</i> , and <i>E. exiliens</i>	Mr. Tom Smith, St. Helen's Square.
The Duck Mole (<i>Ornithorhynchus paradoxus</i>) shot on Lake Cooper, Victoria, Australia	Harry Leigh Atkinson, Esq., M.D.
Double yolked Egg	Mr. W. Taylor, of Poppleton.
Piece of hide of Hippopotamus, and a Fish preserved in Spirit	Mr. F. B. Norcliffe, of Langton Hall.
Twelve specimens of the Venus's Flower Basket, (<i>Euplectella aspergillum</i>), and a glass rope sponge, (<i>Hyalonema</i>)	Mr. Wm. Reed, F.G.S.
A large specimen of <i>Anodon cygneus</i> , from Fairfield, York	Mr. Wood, Goodramgate.
The skeleton of the celebrated racing mare, "Blink Bonny," winner of the "Oaks" and "Derby," 1857	Mr. Wm. P'Anson, of Malton.
The four jaws of a Horse and Mare cut to shew the dentition	Mr. Wm. Reed, F.G.S.
Jaws of Red Deer (<i>Cervus elaphus</i>), cut to shew the dentition	Do.
Two Large Skulls, with Lower Jaws of <i>Hippopotamus amphibius</i>	Do.
A Skull, also an Upper Jaw, and two extra Tusks of the Wart Hog, <i>Phacochoerus Africanus</i> , Gm	Do.
Eleven Tusks of Hippopotamus, one of them very large, and incurved to form a complete circle	Do.
Skull of an Otter (<i>Lutra vulgaris</i>)	Do.
Skull of an Armadillo (<i>Dasypus septemcincturus</i>)	Do.
Skull of Common Cat	Do.
Skull of Badger (<i>Meles taxus</i>)	Do.
Four Large Teeth of the Sperm Whale ..	Do.
Two skulls of Tapir (<i>Tapirus Americanus</i>), Gm	Do.

DONORS.

Skulls of <i>Hyæna crocuta</i> and <i>H. striata</i>	Mr. Wm. Reed, F.G.S.
Very Large Skull of Tiger (<i>Felis tigris</i>),	Do.
Linn.	
Skull of Dog (<i>Canis familiaris</i>).....	Do.
Skull of Polar Bear (<i>Ursus maritimus</i>),	Do.
Linn.	
Skull of Ferret (<i>Mustela furo</i>), Linn	Do.
Skull of Seal (<i>Phoca Groenlandica</i>)	Do.
Skull of Australian Bat.....	Do.
Skull with Antlers of Reindeer (<i>Cervus</i>	Do.
<i>tarandus</i>)	
Four fine Tusks of Walrus (<i>Trichechus</i>	Do.
<i>rosmarus</i>); also a skull of the same,	
divided to shew its structure.....	
Skull of Narwhal (<i>Monoden monoceros</i>),	Do.
shewing both Tusks; also two extra	
Tusks of the same, measuring 8ft. 2in.,	
and 3 ft.....	
Large Tusk of Mammoth, from Siberia..	Do.
Two molar Teeth of the African Elephant	Do.
Four Do. Indian Elephant }	Do.
Two of them cut to shew structure ..	
Large Tusk of African Elephant, with	Do.
double curve.....	
Skull of Monkey, sp. ?.....	Do.
A Black Rat (<i>Mus Rattus</i>), from Lundy	Do.
Island.....	
Skeleton of the English Snake (<i>Coluber</i>	Do.
<i>natrix</i>)	
Skull of Serpent (<i>Python tigris</i>)	Do.
Crocodilian Skull.....	Do.
The Port Jackson Shark (<i>Cestracion</i>	Do.
<i>Philippi</i>)	
A Ray (<i>Rhinobatis granulosus</i>), male,	Do.
with claspers.....	
Skull of the Porbeagle Shark (<i>Lamna</i>	Do.
<i>cornubica</i>), Linn.	
The Arctic Chimaera (<i>Chimaera monstrosa</i>),	Do.
Linn	

DONORS.

The Southern Chimaera, (<i>Callorhynchus</i> } <i>antarcticus</i>).....	Mr. Wm. Reed, F.G.S.
Two Jaws of Shark (<i>Galeus ferox</i>) } from the Red Sea, and <i>Carcharias</i>	Do.
Vertebral Column of a Shark, and of the } Tunny Fish	Do.
Skull of Carp, and of Cod Fish.....	Do.
Skull and Vertebral Column of the } Angler (<i>Lophius piscatorius</i>).....	Do.
Snout of a Saw Fish (<i>Pristis</i>)	Do.

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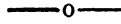
BOTANY.

The following Specimens have been added to the Gardens.

No.	DONORS.
1 <i>Sedum spathulifolium</i>	W. H. Rudston Read, Esq.
2 <i>Thymus palavinus</i>	Do.
3 <i>Veronica alpinus</i>	Do.
4 „ <i>pinguifolia</i>	Do.
5 „ <i>Guthriana</i>	Do.
6 „ <i>pectinata</i>	Do.
7 „ <i>Girdwoodiana</i>	Do.
8 <i>Bahia lanata</i>	Do.
9 <i>Pelargonium lateripes</i> — <i>var</i>	Do.
10 <i>Linum trigynum</i>	Do.
11 <i>Torcenia Asiatica</i>	Do.
12 <i>Euterpe edulis</i>	Do.
13 <i>Begonia Ascotensis</i>	Do.
14 „ <i>discolor</i>	Do.
15 <i>Achimenes metallica</i>	Do.
16 <i>Eulalia Japonica</i>	Do.
17 <i>Arica rubra</i>	Do.
18 <i>Sabal umbraculifera</i>	Do.
19 <i>Curculigo recurvata</i>	Do.
20 <i>Phoenix rubicula</i>	Do.
21 <i>Geonorma Verschaffilzi</i>	Do.
22 <i>Selaginella Pruiti</i>	Do.

DONORS.

23	Selaginella Krausiana aurita	.....	W. H. Rudston Read, Esq.
24	„ „ variegata	....	Do.
25	„ Martensi „	....	Do.
26	Libonia Reedii „	....	Do.
27	Gloxineas (Seedlings)	....	Do.
A Sycamore Tree (<i>Acer pseudo-platanus</i>)			Mr. Wm. Reed, F.G.S.



ANTIQUITIES, ETC.

DONORS, &c.

A Mediæval Vessel and a Pewter Pot, dated 1638, found in the Ouse at Bishopthorpe; also 15 Dutch Tiles from a house in Friargate	Purchased.
A Stone-ware Pot, found in St. Samp- son's Square; with many rubbings from brasses made by his brother, Mr. F. Bell	Mr. T. Bell.
A 17th Century Jug	Mr. G. Acton
A Small Copper Plaque, representing the Conversion of St. Paul, found in Coverham Churchyard	Rev. C. B. Norcliffe.
Mediæval Vessels, Coins, and a Ring, found in the Ouse when dredging	Purchased.
A Brank, an Iron Instrument for the punishment of scolds	Lady Mary Thompson.
Two Celts from Wetwang, a large dish with the figure of Prince Henry upon it, and other Pottery	Purchased at Beverley.
Two Mediæval Stone Coffins	The Rector and Church- wardens of St. Saviour's
170 Denarii found in 1848 in a Roman Vessel at Boston Spa	Purchased.
A Large Moorish Tile from the Alhambra	Mr. W. Atkinson.
The Ancient Saxon Font of Hutton Cranswick, E. R. Y.	Rev. F. Pudsey.
A large number of Implements in Obsi- dian, etc., from Mexico	Anonymous.

DONORS.

A Roman Gold Finger Ring, set with a Carnelian, bearing a bird	} Purchased.
Two Roman Vessels found near the White House.....	} Mr. Spenser.
A Roman Jug, and Three Seals of Arms, 18th century, etc.	} Rev. A. S. Porter.
The Mace of one of the York Sheriff's..	} Mr. T. Bowman.
A Roman Inscribed Stone, from Hasle- head, near Whitby	} Messrs. Foster, Egton..
Several Anglian Relics found at Londes- borough	} Lord Londesborough.
Six Roman Seals of Lead found at Brough	} Rev. Dr. Simpson, Kirkby Stephen.
Three Roman Stone Weights, etc., found in Micklegate.....	} Purchased.
A Roman Instrument of Bone for knitting or netting	} Mr. E. Allen.

COMMUNICATIONS
TO THE
MONTHLY MEETINGS
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,
1880.

The collection of fossils formed by the late Mr. Edward Wood, F.G.S., of Richmond, Yorkshire, is the result of the constant attention and labour of more than 30 years of his lifetime.

Living in a district rich in some of the most beautiful and attractive fossil organic remains, and impelled by a strong natural love for such objects, Mr. Wood became an ardent collector of all specimens of Geological interest; and such was his success that he ultimately became distinguished as the possessor of one of the finest private Geological collections in Britain.

Naturally this collection is particularly rich in objects from the Yorkshire Dales, especially his own dale, Swaledale; but it also includes collections from many other British localities, which were obtained by the help of his scientific friends and acquaintances, in his own travels, or by his liberal purchases. Thus the collection came to spread over a wide area both in space and time, forming a general collection, fairly representing the whole of the geological periods, but specially rich and valuable in certain formations.

To the York Museum this collection is particularly valuable, for it is precisely where we were poor that we here find the greatest riches. It was in the Permian, Coal measures, Carboniferous limestone, and Old red sandstone that our collection,

including Mr. Reed's original Museum, was weakest, while in the Wood collection these groups are most perfectly represented.

Mr. Wm. Reed, F.G.S., our Honorary Curator of Geology, was already acquainted with Mr. Wood's collection, and knew how important an addition it would be to the Society's Museum, and he therefore, as soon as the way to its obtainment was open to him, at once decided to purchase the collection and present it to the Society.

As a private collection of Carboniferous limestone fossils Mr. Wood's Museum has never been equalled in England; and the other groups of the Upper Palæozoic rocks are also particularly fine. It is without doubt in the carboniferous Echinoderms, especially the Crinoids, that the collection is most remarkable, and it is best known to geologists as containing a magnificent series of those crinoids, or "sea lilies," named, in honour of their discoverer, *Woodocrinus*. Some hundreds of specimens of this beautiful fossil were obtained by Mr. Wood, the duplicates being liberally distributed throughout the various museums of Europe, while some 80 slabs, including all the more choice examples, remain in the collection. Many of the slabs contain several heads, some of them exhibiting as many as 9 distinct individuals, so that we have altogether a very forest of these beautiful sea lilies.

The spot where they were found is in a quarry at Lymmas House, Holgate, near Marske, a place in Swaledale, some 13 miles from Richmond, and rather difficult of access. They have not, to my knowledge, been found in any other locality.

Another special feature in Mr. Wood's Museum is the collection of "Lamp Shells," or Brachiopods. These were arranged separately in the cabinets at Richmond, and it is clear from his wide-ranged collecting and careful arrangement that Mr. Wood devoted special attention to this group. The finest of these shells are from the carboniferous limestone of Yorkshire and Derbyshire, but they cover the whole of the geological series, and include many fine groups from the Permian, Lias, Oolitic, and Cretaceous formations.

There are numerous type specimens, principally crinoids and Brachiopods, in the collection, figured and described in various

publications, mostly in the beautiful monographs of Mr. Davidson in the Palæontographical Society's works, and of Professor De Koninck, of Liege. These are mentioned in detail below.

Altogether the collection numbers over 10,000 specimens, there being, according to a calculation by Dr. Henry Woodward, 9,365 selected specimens in the cabinets.

Next, taking account of the collection in chronological order, we find—

1. In the Precambrian rocks an interesting example of Eozoonal Marble from County Donegal.

2. In the Cambrian and Silurian rocks a general series of 968 specimens, amongst which the Trilobites from the Tremadoc rocks, and the Trilobites, Crinoids, and Brachiopods from the Dudley Limestone, deserve especial attention. A magnificent slab of *Periechocrinus moniliformis*, measuring 2 feet 4 inches square, contains 12 separate heads.

3. The Old Red Sandstone is represented by a valuable collection (about 80 specimens) of the remarkable Ganoid Fishes of that period from Scotland. The species are—

Holoptychius Andersoni.

Pterichthys Milleri.

Pterichthys latus.

Glyptopteris leptopterus.

Osteolepis major.

Cocosteus oblongus.

Cocosteus decipiens.

Diplacanthus crassicornis.

Cheirolepis Cunningiæ.

Cheiroacanthus microleptopterus.

Dipterus macrolepidotus.

Pteraspis, and

Cephalaspis Lyelli.

There is also a small series of corals from the Devonian rocks of the south of England.

4. The Carboniferous fossils form, as already stated, the special feature of the collection, the greatest riches being from the Carboniferous limestone. Nearly 4,000 selected specimens were arranged in the cabinets at Richmond, besides which there

are large numbers of duplicates stored in boxes. All the great zoological groups of the period are represented, but the Crinoids, Trilobites, Brachiopods, and Fishes are particularly fine.

The localities are mostly Yorkshire and Derbyshire, but other countries, especially Northumberland, Ireland, Scotland, and N. America are also well represented. There is a set of corals, mostly polished, from the Bristol limestone, and of crinoids some 300 very choice specimens, belonging to numerous species. These include six species of *Woodocrinus* — *W. expansus*, *W. dichodactylus*, *W. macrodactylus*, *W. goniodactylus*, *W. longidactylus*, and *W. fimbriatus*, with the type specimens of each; also the beautiful figured type of *Hydreionocrinus Woodianus*. The *Echinoidea*, or sea urchins, are represented by the *Archæocidaris Urii*, *Melonites Etheridgii*, and *Palæchinus sphericus*, the latter being the figured specimen.

The Carboniferous Trilobites, of which there are 95 specimens, belonging to the genera, *Phillipsia*, *Griffithides*, and *Brachymetopus*, also form a valuable part of the carboniferous series. The Brachiopods are extremely choice, numbering over 1,200 selected specimens, and including 7 figured types drawn and described by Mr. Davidson in the monographs of the Palæontographical Society.

The remaining groups of the Mollusca are also well represented, there being many choice specimens.

In the Coal Measure group the land Flora is very fully and beautifully illustrated by some 220 specimens of Ferns, Tree Ferns, *Equiseta*, and *Lycopods*, found in the coal shales and sandstones of Yorkshire, Durham, Newcastle, Edinburgh, Somerset, and elsewhere. From Ireland we have large fronds of the noble fern *Adiantites Hibernicus* out of the Kiltorecan sandstone.

Of the Fishes of the coal period there are 90 specimens, including some very fine *Gyracanthus* and *Pleuracanthus*, and the figured type of *Amphicentrum granulosum*; also good examples of *Megalichthys*.

5. The Permian rocks are far from being so prolific of organic remains as the carboniferous, but Mr. Wood's collection of their fossil contents is unusually rich and complete. They

are principally Fishes, Plants, and Shells, and in the two former the collection is specially excellent. Forty-two beautiful fishes are from the neighbourhood of Midridge, in Durham, one of them, namely, *Dorypterus Hoffmanni*, being the figured type,

The other species are—

Pygopterus mandibularis.

Palæoniscus elegans.

„ *comptus*.

„ *varians*.

„ *glaphyrus*.

„ *altus*.

„ *longissimus*.

Platysomus macrurus.

Coelacanthus granulatus.

Acrolepis Sedgwickii, and

Platysomus striatus.

The Plants number 49 specimens belonging to the species *Caulerpites selaginoides* and *Voltzia Phillipsii*.

The large concretionary rock masses, 15 in number, from Sunderland, also deserve attention.

6. From the Rhætic rocks there are a few Shells and Insects' wings, also fifty minute Fish Teeth from the Triassic drift, collected by Charles Moore, Esq., of Bath.

7. The Jurassic collection (Lias and Oolite) numbers over 1,300 specimens. It is valuable for its excellent Brachiopods, of which there are 466 selected specimens, including some of the interesting diminutive types from the Lias and Inferior Oolite of Bath.

There is a very perfect example of a small *Ichthyosaurus* skeleton, measuring 3 by 1 feet, also the jaws, paddle and other portions of *Ichthyosaurus*, all from the Lias of Lyme Regis. Also a beautiful head, with part of body of a fish (*Pachycormus*), from the Lias of Ilminster.

A fine example of *Ammonites stellaris*, over 2 feet in diameter, is cut and polished to shew its internal structure.

In the Yorkshire Oolites the plants from the Estuarine series of the coast are the most noteworthy.

8. The Cretaceous series has the same general characteristics as the Jurassic, namely, moderate in the series of Mollusca, but rich in Brachiopods, and with some valuable Reptile bones (*Iguanodon*) from the Wealden of the Isle of Wight. The Brachiopods number 300, and there are in all 760 cretaceous fossils.

9. In the Tertiary groups the collections are of a general character, and require but little special reference. They amount to nearly 1,000 specimens, belonging to each of the subdivisions of the period.

10. In the Quarternaries is a series of 186 specimens from the Scotch Drift, and a number of peat-stained bones from the neighbourhood of Richmond.

It will readily be seen from the above account that this collection is a most important and valuable addition to the York Museum. Rarely, indeed, can it be the good fortune of any museum to receive so rich an accession to its treasures. All the specimens are well selected, and indeed the whole collection is marked by the discriminating hand of one who greatly loved good specimens, and spared no trouble or reasonable expense in their acquisition. This general excellency of the specimens well befits them for taking their place amongst the great collection formed by Mr. Reed himself, and presented to the Society some two years ago.

Four great collections have been formed in Yorkshire during the last half century, namely, those of Mr. Bean and Mr. Leckenby, of Scarborough; Mr. Wood, of Richmond; and Mr. Reed, of York. Of these, a considerable part of Mr. Bean's fossils were purchased by the Society in the year 1860 for the sum of £200; and two of the others, namely, Mr. Wood's and Mr. Reed's, have, by the public spiritedness and liberality of the latter gentleman, found their abiding place in the York Museum. The Leckenby collection is in the Cambridge Museum.

Mr. Reed's original collection far exceeded any of the others, consisting as it does of over 100,000 specimens. The Society is now indebted to him for the further magnificent gift of the Wood collection, by which our principal deficiencies give place to great richness.

This account would not be complete without a reference to a catalogue made two years ago by Dr. Henry Woodward, of the British Museum, by whom it is now kindly given to the Society. This catalogue will be preserved in our Library, to remain a permanent record of the details of the collection.

NOVEMBER 2ND.—The REV. CANON RAINE read a short paper, in which he gave some new facts relating to St. Mary's Abbey. He said :—‘The notices which I have to offer about St. Mary's Abbey are notelets merely, and deserve comparatively little attention, still they have a value of their own, and help to build up the history of a fabric which must always be full of interest. 1. Let me speak of the choir, some of the beautiful ruins of which still exist. In 1270 the Norman choir was in a dangerous state, and it was found necessary to remove the high-altar from the chancel, most probably into the nave or transept. The chancel would then be boarded off and the work of demolition would begin. On the 9th of June, in the following year, the foundation stone of the new choir was laid by the great Abbat, Simon de Warwick, who, seated in his official chair, whilst his monks were standing around, laid the mortar in which the first stone was bedded. The stone for the building was brought from a quarry in Thevesdale, on Bramham Moor, which had been granted to the church by John de Vavasour. 2. Let me now mention some new facts about the great central tower. In 1278 the progress of the new chancel had been so considerable that it was necessary to begin with the tower, and as we may conceive that the means of the convent would be by this time very deeply dipped into, it became desirable to seek for extraneous help. Accordingly we have among Dodsworth's MSS. at Oxford a copy of a document issued by Archbishop Giffard promulgating an indulgence of 40 days to all who gave their aid to the work. This indulgence is not found in the Archbishop's Register, which is still preserved, but it is probable that Dodsworth found and transcribed the original document among the archives of the monastery itself, in St. Mary's Tower. It is evident that the great central ornament of the Abbey consisted

of a tower surmounted by a tall spire of wood, covered with lead. You can still see the four stout pillars which supported it. As to the fate of this Tower, happily there are preserved, also among Dodsworth's MSS. at Oxford, two or three leaves of an old Northern MS. Chronicle, on one of which is recorded the fact that, at sunrise, on St. James's day, 1376, in a great storm, this spire of St. Mary's was struck by lightning, and set on fire, and, with the Tower itself, and bells, was burnt and ruined. Some sixty years after this, the central spire of Durham Cathedral perished in a similar manner, and it was the frequently occurring fate of spires in different parts of the country. There is evidence to show that the monks of St. Mary's speedily endeavoured to repair their loss, but we have nothing to indicate the character and architectural features of either fabric. And now let me say something on a point which, two or three years ago, made some little controversy in the public prints. I allude to the old gateway, which used to be the sole entrance to the Blind School. In 1266 the Abbat and Convent of St. Mary's surrounded their precinct with a large stone wall, the greater part of which is still in existence. They permitted no access to the monastery except through the great entrance in Marygate, or by the river, of the frontage to which, for a considerable distance, they were the sole proprietors, and from the enjoyment of which they shut the public out. In the beginning of the sixteenth century the City of York was honoured with several visits from the Princess Margaret, daughter of our Henry VII. The citizens generally were most demonstrative in their loyalty, and the Abbat and Convent of St. Mary's, rivalling the city in its greeting, manifested their delight in a most remarkable way. The Princess was to sojourn on one occasion in the Abbey, and to save her the trouble of a long journey down Bootham and Marygate, the wall near Bootham Bar was broken through—a gateway made through which the Princess could pass, and a tower erected, to serve as a porter's lodge. The tower you can still see, but the gateway is not that through which the Princess went, but a restoration of it, very badly done, and at a comparatively recent period, probably about two centuries ago.

This is clearly shown by the character of the masonry. The future of the ruins of St. Mary's Abbey is a subject which no one can contemplate without apprehension and concern. They are suffering from the ever-increasing effects of atmospheric influences by which they will sooner or later be destroyed. The beautiful vine-leaves which ornament the hollows of the great west door, become every year fainter and more indistinct. When I first saw, 35 years ago, the equally beautiful door which leads from the vestibule into the ruined Chapter-house, the carving was exquisitely crisp and delicate. Now, it is mouldering away so rapidly that, if it is to be saved at all, it must be put under cover without farther delay. It may seem cruel to remove the stones and set them up in the Hospitium, but some such severe remedy must be attempted before long if the sculptures are to be preserved. Another desideratum is the proper exhibition of the remains of the chancel. There has been too much of a tendency to subordinate the ruins to the garden, instead of subordinating the garden to the ruins. What I recommend, and what is adopted in other places, as for instance at Fountains Abbey, is this, to clear away the soil and debris to the old floor level, that we may see the old lines, and expose the bases of the pillars, the remains of the encaustic pavement, and such monuments as remain. The difficulty here is the presence of several large chestnut trees, which must be allowed to fall into the decay which is so imminent, and which, on no account must be renewed. All trees and earth must be removed from within the walls of the abbey. And more than this. It is necessary that on the north side of the chancel the buttresses and walls should be properly shown, and for this the earth between the church and the new garden, or the greater part of it, ought properly to be taken away. We shall never know the character of the architecture, or ascertain how the old church and the new are mutually connected, unless this earth is removed.

DECEMBER 7TH.—MR. T. S. NOBLE, the Hon. Secretary, read a Paper by the REV. CANON RAINE, who was unavoidably absent. The paper was as follows:—"On one of the last days

in the month of October a very curious discovery was made in the garden of St. Mary's Convent, near Micklegate Bar, in this city. A new wing is to be added to that building contiguous to Nunnery Lane, and, whilst making the necessary excavations, at a depth of four or five feet, the labourers came upon three small domestic altars and the greater part of a large statue, which were huddled together, and had evidently been buried for the purpose of concealment. The Romans, when they deserted Eburacum, did not wish to expose these evidences of their domestic worship to the neglect or wantonness of those who came after them. In 1870 as many as seventeen altars were discovered at Maryport, in Cumberland, which had evidently been secreted. There is every reason to hope that similar discoveries will be made in York from time to time. The place where the relics at the Convent were deposited is the site of a Roman cemetery, and, two or three feet below the altars, in their immediate vicinity, the remains of the dead were discovered. Those who hid these sculptured stones probably imagined that they would escape observation, as they expected that no one would care to disturb the bodies of those who had been interred below.

I. The smallest altar in the series is only eleven inches in height, and is very clearly inscribed—

DEO VE
TERI
PRIMVL
VS VOL.
M.

which may be thus extended—*Deo Veteri Primulus Volusius (or Volusianus) merito?* The contracted name *Vol.* already occurs on the base of a statue of Eternity in our Museum. I suppose that the last letter in the inscription, *M.*, stands for *Merito*, one of the four words which constitute the usual formula upon altars and tablets. I am not aware, however, of another instance in which *Merito* stands by itself, and the solution of this difficulty must be left to those who are more skilled in epigraphy than I am. And now who is the *Deus Vetus* to whom this little altar is dedicated? Occasionally we find the word written *Vitus*, the sound of *Vitus* and *Vetus* being prac-

tically the same. There have been as many as seventeen altars discovered in the North of England which are dedicated to this deity, one of which, from the Roman Wall, has been for many years in our Museum. There are thirteen others which are dedicated to the *Dei Veteres*, or the *Numina Vitira*. All these words are parts, I doubt not, of the adjective *Vetus*, although it is quite possible that ignorant people from long and indiscriminating use coined at last a deity of the name of *Viteris* or *Veteris*. On an altar at Netherby, in Cumberland, *Vetus* or *Viteris* is associated with an obscure deity of the name of Mogon, but as there is no doubt as to the reading of this inscription, it is unnecessary to dwell upon it. Dr. Bruce, and other scholars, are struck by the prevalence of altars, with these curious dedications, in the North of England. It is plain that the faith of many was in a curious state, when, amid the host of new deities which thronged the Roman pantheon, they could burn incense and pay their vows to the ancient deity or deities, without apparently being able to remember and record their names. It is comparatively easy to understand who were the *Dei Veteres*, but who, *par excellence*, was the *Deus Vetus*? Dr. Bruce seems to think that Mithras, the Sun-god, was the deity intended. Dr. McCaul, of Toronto, a very distinguished epigraphist, makes the general remark that altars with such dedications were a protest, probably by Britons, against the flock of new divinities by which the old were being gradually thrust out.

II. An altar, 17 inches in height, and very nicely wrought and ornamented. The sides are fluted, as with reeds, and retain traces of red paint or *minium*. The inscription is as follows, given at length—

C.IV LIVS
CRESCENS
MATRI
BVS DO
MESTICIS
V. S. M. L.

The four last letters, one of which is out of its accustomed place, constitute the formula *Votum Solvit lubens merito*. It is also unusual to find the name of the divinity placed after that of the

dedicator of the altar. The dedicator here is a person with the names of *Caius Julius Crescens*, who may perhaps be identified with *Julius Crescens*, who dedicated an altar to Mercury, which was found at Birrens, in Scotland. The *Matres Domesticæ* are the presiding deities of the house and home. Two altars ascribed to them have been already found in Britain, both of them in the neighbourhood of Carlisle. The worship of the mother goddess was very popular in northern Europe, and our learned archæologist, Mr. Charles Roach Smith, has given in more than one of his works a most interesting account of it. They are generally represented in sculpture as "three seated figures holding baskets of fruit in their laps," and various titles are given to them, indicating often the native country or town of the dedicator, who was far removed from it. The *Matres Transmarinæ* are sometimes appealed to. There are about thirty altars in Britain dedicated to the *Deæ Matres*, all of which, with the exception of two, are in the North of England. We have three of these with inscriptions in our own museum, one of which honours the mothers of Africa, Italy, and Gaul, who had charge of the Sixth Legion Victorious. Another, made by Marcus Rustius Massa, is to his own mothers, meaning, probably, those of his own country and home. *Matres Sux* are therefore partly identical with *Matres Domesticæ*, to whom the C. Julius Crescens burnt his incense, and ascribed the comforts and joys with which, we hope, his house and home were filled.

III. An altar, thirteen inches high, made of coarse sandstone, on which the letters are somewhat worn and rubbed. The inscription is peculiarly interesting, and may, I think, be read with tolerable accuracy now that the damp has exuded from the stone. I omit the contractions :—

DEO MARTIC
AGRIVS
ARVSPEX
V. S. L. M.

It is dedicated to Mars, the God of War, by Caius Agrius, the soothsayer or diviner. Mars, under various titles, was greatly honoured among the Romans, especially in Britain. In the South of England his name occurs nine or ten times on metallic objects, and four times upon altars. This is the forty-eighth

instance in which a dedication to Mars has been found in the North. And when we remember that the Roman power in the far north was never permanently established, it was natural that they should look for the protection of Mars, who was to lead them into victory. The name of *Agrius*, which appears upon the stone, is common enough in inscriptions abroad, but occurs here for the first time in Britain. The word *aruspex* is equally rare in this country. The *aruspices* or *haruspices* were soothsayers and diviners, who brought originally from Etruria to Rome the mysterious lore of that ancient country. In the time of the empire there was a college at Rome of sixty *haruspices*, and, although often discredited, the body seems never to have died out whilst the empire lasted. It was their object to interpret to men the will of the gods, and to divine what was coming to pass. The entrails of sacrificed animals, the character of the fire that consumed them, the cries and flights of birds, sights and sounds, and natural phenomena of all kinds, these were the field from which the *haruspices* professed to learn the will of the gods. We know already from the Life of the Emperor Severus that at the close of his days the signs were against him, showing that the *haruspices* were at that time represented in Eburacum. This sculptured stone is the first occurrence of the name in any inscription in Britain. And to whom could *Caius Agrius*, in his own opinion, better address his vows than to the God of War, the knowledge of whose will could ensure his own worldly prosperity and renown, as well as the honour of his country.

IV. The last product of these excavations is a statue in light-coloured grit, deficient in the feet and right arm from the shoulder, but still five feet and a half high, and strikingly fine. It is probably the work of a native sculptor, who has had a marble figure as his model. The figure is in military dress, wearing a noble helmet, with his hair in fillets close to the forehead. A belt, passing over the right shoulder, holds a sword. The left hand is resting on a large oval shield, more than two feet high, with a boss in the centre. The legs are greaved. In the missing right hand there must have been a lofty spear, probably of metal. Statues of any kind are so rare in this country that fine work such as this figure exhibits must always

excite considerable interests. It is impossible, of course, to say "what man or god" is represented, but I am inclined to think that this statue, as well as one or two others in the North, are intended to pourtray the God of War. We cannot fail to remark, in conclusion, how this discovery connects Eburacum in epigraphy with the Stations on the Wall. Our city was the great military depôt of that most important district, and the Sixth Legion, which had its headquarters with us, was the great moving and directing power in the North. If we want to know how *Mars*, the *Deæ Matres*, and the *Deus Vetus* were honoured, we must examine the discoveries in the great fortified posts on the line of the Wall. One word more. It is, I believe, the earnest wish of the people of York that the curious remains which I have been describing should, when the excavations are completed, find their way into our Museum. No one could have been kinder or more helpful to me in my examination of these sculptures than the Reverend Mother and the other authorities of the Convent, and I feel very unwilling to ask them to consent to a surrender which would practically remove these objects for ever from their sight. But our whole Museum is an example of sacrifice for the public good. By themselves, such objects lose half their value; when associated with others we begin to see what Eburacum must have been like. It has been said more than once by scholars of repute that Eburacum could not have possessed the importance ascribed to it, as it can show so few traces of the dignity which it claims. That slur, we are thankful to say, is being removed gradually but surely. It cannot be effected, as some of you know, without considerable exertion and labour. But it is the sympathy and co-operation, not of one but of all, that we require. The Yorkshire Philosophical Society has experienced for nearly sixty years the generous kindness of the people of York, and is proud to recognise long ago on her list of benefactors the authorities of the Convent.

MAY 4TH.—The Honorary Secretary, Mr. T. S. NOBLE, F.G.S., gave an account of the scientific work of Professor

E. E. Deslongchamps, who was recently elected an honorary member of the Society.

Mr. NOBLE said that M. Deslongchamps was one of the most distinguished of the French savants and palæontologists. His writings and original researches and discoveries in the Jurassic rocks of Normandy, embodied in a series of publications extending over a period of some twenty-five years, are well known and highly appreciated. Their value as works of reference is greatly enhanced by being copiously illustrated with a series of well-executed and accurate plates, lithographed by the author. His most important work, now in course of publication in parts, has for its title, "The Jura of Normandy," being palæontological studies of the different rocks and strata of which it is composed, and containing the descriptions, with plates, of all the fossil Vertebrata and Invertebrata. The first part of the serial, issued in 1877, is principally, but not exclusively, devoted to a description of the Reptilia and Cephalopoda; the second, and at present the last, being a continuation of the same subjects, the Cephalopoda being more largely illustrated. The author has not confined his researches and studies to palæontology, recent ornithology being one of the subjects with which he is familiar. The photographs which he had presented to the Society were of more than passing interest to the citizens of York, as they recalled to the mind of most Englishmen an incident in the life of William the Conqueror before his memorable conquest of England at Hastings. It has been a fact well known to historians that at the time of William's marriage an impediment existed to its legality, the nature of which has never been correctly ascertained; but the act drew down upon him the censures of the Church, which were not removed for many years afterwards. It has been supposed that the marriage was one of the many cases of spiritual affinity which the Church of Rome disfavours unless specially allowed by dispensation. By the aid of Lanfranc, then the head of a religious house in Normandy, and who was sent by William to advocate his cause at the Court of Rome, he obtained, after considerable delay, the required dispensation legalising his marriage. Whether in condonation of the offence,

or as a condition attached to the dispensation, is not known, but the result was that William and his wife, as some sort of reparation for the scandal created, each built and endowed a church in the town of Caen, in Normandy, then one of the principal cities in his duchy. The two churches were erected, and are now known as the "Abbaye aux Hommes" and the "Abbaye aux Dames," and photographs of each, through the kindness of M. Deslongchamps, are now in the possession of the Society. A considerable part of the ancient structures still remains. The "Abbaye aux Dames," the church built by William's consort, was dedicated in the memorable year of the conquest, on the eve of William's expedition, the success of which made him absolute master of England. In this church Matilda offered her prayers for the success of her husband's arms, and in it she was buried. In the church built by William a large blue stone still marks the spot where the Conqueror's remains were laid, but the grave has been long since desecrated, first by the Huguenots, in the 16th century, and still further by the Revolutionists, in the 18th century.

JUNE 1ST.—The Honorary Secretary, Mr. T. S. NOBLE, read a paper on M. Joachim Barrande, and the Darwinian Theory of Evolution.

Mr. NOBLE said that it would be in their recollection that various honorary members of the Society were elected at the recent annual meeting, and at the last meeting he had the pleasure of reading a letter of thanks from a *savant*, a very distinguished foreigner, who had been elected an honorary member, and who had forwarded to the Society several valuable works. He had now pleasure in reading a letter from a most able and distinguished geologist, who had presented to the Museum the books which were upon the table—M. Barrande, of Prague:—

(COPY.)

"Prague, 14th May, 1880.

"To the Honorary Secretary,—In inscribing my name amongst its honorary members, the Philosophical Society of Yorkshire has conferred upon me an unexpected distinction, with which I am very much flattered.

"I beg of you to express to it my sincere gratitude for this mark of kind and friendly sympathy.

"Accept, sir, the expression of my very high esteem.

"J. BARRANDE.

"I send you by the same post four brochures or pamphlets as a present to the Philosophical Society of Yorkshire :—

"1870. Defence of Colonies, with Map and Sections.

"1872. The different forms of crustacea and fishes.

"1877. Cephalopoda.

"1879. Brachiopoda."

Mr. NOBLE added that in the first work in the list one of the most interesting points to which M. Barrande had drawn attention was the occurrence of what he termed Colonies, *i.e.*, groups of fossils having special characters which occur in beds intercalated in strata, having a different fauna, but subsequently recurring in higher beds as the predominant fauna. M. Barrande regarded them as migratory and temporary offshoots from some co-existent but distant fauna, which, subsequently, however, came into the same area in force, displacing the older fauna altogether. Those researches, and the conclusion deduced from them, were of the highest practical importance to the geologist and palæontologist, and were deserving of the most careful study. He (Mr. Noble) had thought it might not be uninteresting on the occasion of the last meeting of the session before the vacation to refer to the valuable works of M. Barrande on "The Defence of Colonies" and "The Cephalopoda," and he had drawn up a few notes on the subject, which he would now read. Mr. Noble then proceeded:—This distinguished and indefatigable investigator and laborious worker in the field of geology and palæontology amongst the Silurian rocks of Bohemia, M. Joachim Barrande, has most deservedly gained for himself in this branch of science a world-wide reputation. His researches extend over the complete fauna of an entire geological formation. M. Barrande is a native of France, and commenced his researches in 1833 under great difficulties, having to make himself acquainted with the language of his partly-adopted country in order to facilitate his intercourse with the Bohemian workmen engaged in the

quarries round Prague. He not only assisted them with money, but supplied them with instruments to facilitate their labour. Anterior to 1840 the number of species scientifically indicated from the Silurian rocks of Bohemia was only 22, but by M. Barrande's vast energy these were soon increased to more than 1,200; at that period only two species of Brachiopods were known in Bohemia, but he now transmits to his successors above 600 named Silurian species. These valuable researches, so perseveringly and uninterruptedly carried on to the present time, are recorded in his great and magnificent work, "The Silurian System of Central Bohemia." His work on the Cephalopoda was commenced in 1865, and, now completed, extends to 544 large 4to plates and to about 3,600 4to pages of letterpress. In the smaller work on the table, the author has given a general *resumé* of his studies on the Cephalopoda, with additional notes, and has announced other works as now in progress. One on the Palæozoic Gasteropods will consist of more than 120 plates, and another on the Brachiopoda of 114 plates. In his two brochures, "The Defence of Colonies" already alluded to, and "The Cephalopoda"—for these must be studied in conjunction—he treats at some length the subject which at the present time is of such absorbing interest to palæontologists and naturalists generally, the attractive and fascinating theory of evolution by descent, of Darwin, of which he is a decided opponent, and boldly affirms that the theory of evolution of the cephalopods, like that of the trilobites, appears to be a mere product of the imagination, without any foundation in fact. In the brochure on the cephalopods, containing a *resumé* of the whole subject, is a masterly and exhaustive summary in support of the author's views. The notes are too long either for quotation or satisfactory analysis, the whole requiring the most attentive study. At page 248 he refers, evidently with great pleasure and satisfaction, to the opinions of three eminent *savants*, who have arrived at conclusions in distant and independent paths very near to or identical with those which the study of the cephalopods has led him to adopt. One of these *savants*, Mr. Thomas Davidson, he styles "our illustrious master and friend;" the second is, M. Grand Eury; and the third,

Mr. Carruthers, who is at the head of the botanical department of the British Museum, and considered one of the most distinguished and able botanists in Europe. M. Barrande, in alluding to Mr. Davidson, states that that eminent geologist published in the "Geological Magazine" a paper entitled, "What is a Brachiopod?" which exposes in the most succinct and most clear manner the results of all the labours and discoveries relative to the Brachiopoda, results to which Mr. Davidson has contributed incomparably more than any other investigator. Mr. Davidson is also the author of the very extensive and exhaustive work on Brachiopoda, now in the course of publication by the Palæontographical Society. M. Barrande quotes largely from Mr. Davidson's three papers in the "Geological Magazine" for 1877. We shall here merely epitomize some of the latter's opinions and the conclusions at which he has arrived. At page 271 he says, "Darwin's tempting and beautiful theory of descent with modification bears a charm that appears to be almost irresistible, and I would be the last person to assert that it may not represent the actual mode of specific development. We are stopped by a number of questions that seem to plunge the conception in a maze of inexplicable, nay, mysterious difficulties; nor has Darwin, as far as I am aware, said how he supposes the first primordial form to have been introduced. The theory is, at best, as far as we can at present perceive with our imperfect state of knowledge, but half the truth, being well enough in many cases as between species and species; for it is evident that many so termed species may be nothing more than modifications produced by descent. It applies likewise to accidental variations as between closely allied genera; yet there is much more than this, with respect to which the theory seems insufficient. The strange geological persistency of certain types, such as *Lingula*, *Discina*, *Nautilus*, &c., seems also to bar the at present thorough acceptance of such a theory of general descent with modification." He further states that "We have no positive evidence of those modifications which the theory involves, for types on the whole appear permanent as long as they continue, and when a genus disappears there is no modification, that I can see, of any of the

forms that continue beyond, as far as the brachiopoda appear to be concerned, and why should a number of genera such as *Lingula*, *Discina*, *Crania*, and *Rhynchonella* have continued to be represented with the same characters, and often with but small modification in shape during the entire sequence of geological strata? Why did they not offer modifications or alter during those incalculable ages?" Alluding also to other genera, he says, "They are all possessed of such marked and distinctive internal characters that we cannot trace between them and associated or synchronous genera any evidence of their being either modifications of one or the other, or of being the result of descent with modification. Therefore, although far from denying the possibility or probability of the correctness of the Darwinian theory, I could not conscientiously affirm that the Brachiopoda, as far as I am at present acquainted with them, would be of much service in proving it." In an inaugural address read before the members of the Geologists' Association in 1876, with special reference to the theory of evolution, Mr. Carruthers states: "The time required for such evolutions is beyond conception, and vastly greater than even the largest estimate of geologic time that has ever been made. That the rocks testify to a development of some kind is beyond doubt; but development is not necessarily the sole property of the mechanical evolutionist. At present we have no data to guide to a solution of the question as to the mode by which the development was accomplished. One thing is certain, that the whole testimony of the vegetable kingdom, as it is known to us from the remains preserved in the stratified rocks, is opposed to the doctrine that the development is due to evolution by descent." In the "Scientific Review," published in France, for June, 1877, there is an official report of a work recently published by M. Grand Eury upon the carboniferous flora of Central France by Mr. R. Zeiller, mining engineer, and this work may, perhaps, be quoted as one of the most exhaustive that has been written on the subject. The writer says it is remarkable to see in all this period the flora preserving a perfect unity from the base to the summit by the same classes, orders, and families; then to completely disappear. No species, per-

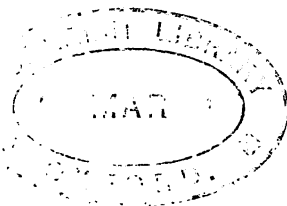
haps even no genus, is found again in the trias, in confirmation of the idea of a separate biological period, and contrary to the theory of continuity. During the course of this long series of successive deposits, no progressive modification of species can be proved. The genera follow the same law as the species; they disappear without sub-division or transformation. Let us add that contrary to the hypothesis of progressive development, each vegetable group shews itself, from its appearance, with the perfection of all its characters. In a word, nature appears to have given to its works, from the first blush, all the perfection of which they are capable. M. Barrande further remarks: "After the *resumé* of our studies upon the Cephalopods we cannot refrain from acknowledging a great harmony between the results obtained by M. Grand Eury and those which we have expounded, however dissimilar and however distant these two great subjects of scientific research may be; we see that the real development of vegetable life, like that of animal life, has been submitted to the same laws. The facts show that these simple and constant laws have nothing in common with the theories of evolution." In conclusion, M. Barrande remarks "that the testimony of these two witnesses, M. Grand Eury and Mr. Carruthers, taken from the vegetable kingdom are in perfect harmony and accordance with those, whether derived from the Brachiopods, or the Cephalopods, or the Trilobites, in the animal kingdom. One of the reviewers remarks: "Nor can those who are not prepared to accept M. Barrande's views with regard to the separate origin of every individual species or variety fail to admire the marvellous and vast labours of one of the most distinguished and indefatigable of pioneers in palæontological science." In concluding, Mr. Noble said he thought that it would be a satisfaction to those who did not agree with the Darwinian theory to know that the opinions of the eminent scientists to which he had referred were also supported by the works of the late Professor Phillips and Dr. Bigsby, F.R.S., F.G.S., formerly British Secretary to the Canadian Boundary Association, and the author of "*Thesaurus Siluricus*," and a still more recent work, "*Thesaurus Devonico-Carboniferus*."

Yorkshire Philosophical Society.

ANNUAL REPORT

FOR

MDCCCLXXXI.



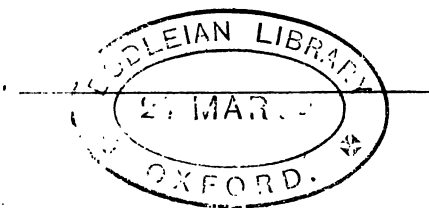
ANNUAL REPORT
OF THE COUNCIL
OF THE
YORKSHIRE
PHILOSOPHICAL SOCIETY

FOR

MDCCCLXXXII.

PRESENTED TO THE ANNUAL MEETING,

FEBRUARY 6TH, 1883.



YORK:

J. SOTHERAN, BOOKSELLER, CONEY STREET.

1883.

TRUSTEE
OF
THE YORKSHIRE MUSEUM,

APPOINTED BY ROYAL GRANT.

COLONEL EDWARD W. HARCOURT.

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OF THE
Yorkshire Philosophical Society.

HER MAJESTY THE QUEEN.

H. R. H. THE PRINCESS OF WALES.

PATRONS.

H. R. H. THE PRINCE OF WALES, K.G.

H. R. H. THE DUKE OF CONNAUGHT, K.G.

HIS GRACE THE ARCHBISHOP OF YORK, F.R.S.

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REPORT OF THE COUNCIL
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,
FEBRUARY 6TH, 1883.

In presenting the Report for the year 1882, the Council congratulate the Members of the Yorkshire Philosophical Society on the prosperity of the Society during the past year, both in its financial and scientific affairs. The Report will briefly disclose the present condition of the various departments of the Museum, and the balance sheet of the Treasurer will show that financially the year has been one of equal prosperity. During the last seven years the Council, from various causes which have been explained from time to time in their annual Reports, chiefly arising from the expenses incident to the augmentations which have been made to the various collections in the Society's rooms, have had to report a gradually increasing deficit at the close of each year. The debt due to the Treasurer, apart from the permanent debt, amounted at the close of last year to £1,642 15s. 4d., and last year there was an excess of expenditure over income of upwards of £250. Although the income of the Society during the present year is small compared with those on previous occasions, the Treasurer has much pleasure in reporting that the excess of income over expenditure on the past year's balance sheet amounts to £59. 0s. 7d. This pleasing feature in the Society's finances fully justifies the statements made by the Council on previous occasions that the debt will be gradually extinguished. This part of the subject will be further dealt with on the presentation of the Treasurer's balance sheet. Reference will now be made to the present condition of the various departments in the Museum.

GEOLOGY.—The additions to the Geological Department during the year include gifts from the following gentlemen:—Rev. Canon Raine, M.A.; Rev. E. A. Healy, M.A.; Rev. J. Taylor, M.A.; Mr. William Reed, F.G.S.; Professor O. C. Marsh; Professor A. S. Herschel; W. H. Hudleston, Esq., M.A.; C. D. Wolstenholme, Esq.; J. S. W. Kirkpatrick, Esq.; A. J. Barry, Esq.; S. Chadwick, Esq.; G. Edson, Esq.; J. E. Jones, Esq.; F. Wright, Esq.; — Jackson, Esq., and C. S. Middlemiss, Esq.

Some of the most important of these gifts are fossils from the Yorkshire rocks, such as the choice specimens of *Sponges*, *Mollusca*, *Echinodermata*, etc., from the Yorkshire Chalk, presented by Mr. S. Chadwick, of Malton; and the series of Ironstone fossils from Grosmont, presented by Mr. Wm. Reed.

Also the collection of Yorkshire fossils has been further increased by numerous specimens, collected by the Keeper of the Museum, many of them from localities hitherto unrepresented in the Museum. These are species from the Lower Jurassic Sands and Dogger of the Peak near Whitby, and from Glaisdale, the Scarborough Limestone of Gilling near Coxwold, and Stonecliffe Wood near Castle Howard, and from the Lower and Middle Oolites, especially the Kelloway Rock, of the new Railway Cuttings (Hull and Barnsley line), near South Cave.

A collection of Yorkshire Rocks is also in course of formation and many specimens have been obtained. In this way it is hoped that the inland Geology of Yorkshire will become more fully illustrated in the Museum, thus supplying a conspicuous want in the County collection.

From Norway a series of rocks principally metamorphic has been collected, and some examples of the newly discovered fossil remains from the metamorphic schists of Vagtdalen, South of Bergen, have been obtained.

The arrangement of the specimens has been continued as before, the Coal Measures, Devonian, Carboniferous Limestone, Old Red Sandstone, Silurian, and Cambrian series, being placed in the drawers of the central case in the Tertiary Room.

The drawers have been provided with card-board covers to protect them from the dust.

The Upper and Middle Oolites of Yorkshire have been re-arranged in the Saurian Room, also the Yorkshire Chalk, the recent gifts being added.

Mr. H. Keeping, of the Cambridge Museum, has kindly devoted a fortnight to a careful revision of our collection of Oligocene and Eocene fossils, arranging the species in their proper zones.

The Curator of ANTIQUITIES reports a large accession to the curiosities under his charge, so large, indeed, that in no preceding year have so many objects of interest found their way into this Department of the Museum.

No Roman inscription indeed has been found during the year, and no sculptured stone of any importance; but, to represent the period of the Imperial occupation of Britain, we have fifteen urns acquired during the year; and two tombs of tiles discovered on Bishophill, in one of which was a bracelet made of gold and silver wires. To the collection of old English pottery and glass more than fifty additions have been made, and in every part of the Antiquarian stores fresh objects of interest may be seen, which will be enumerated either in the Catalogue of Antiquities, or in the Report for the year.

Special allusion must be made to three conspicuous additions to our treasures.

1. A large number of silver pennies of Edward the Confessor and William the Conqueror, discovered in York last summer. The pennies of Edward, which are very numerous, are remarkable for being productions of the York Mint, and in variety and excellence of workmanship bear abundant testimony to the importance of York at that early period. The coins, speaking generally, belong to the last five or six types of the Confessor's coinage and the two earliest of William the Conqueror, and furnish some most curious additions to the numismatic history of those two reigns.

2. In July last the Society received as a gift from Mr. Edward Hailstone, of Walton Hall, near Wakefield, an old friend and benefactor, a large collection of antiquities. They comprise some fifty stone and bronze implements of the pre-

historic era, numerous specimens of Roman, Etruscan, and English pottery; some forty matrices of foreign seals prior to the sixteenth century; many original impressions of Royal seals of England; and a very large quantity of casts and impressions of the same kind.

The choicest part of Mr. Hailstone's gift is a noble pair of Roman bowls of bronze, found at Finningley, near Doncaster, which would be an ornament to Museums far more important than ours.

3. The last and most conspicuous place in the list of accessions must be occupied by the collection of antiquities made by the late Mr. George Alderson Robinson, of Reeth, which has been most generously presented to us by his representatives. The kernel of this collection is a very large assemblage of pre-historic antiquities from Ireland, which was purchased at Edinburgh in 1877. Among them are two large bronze cauldrons of bronze, and a very fine trumpet of the same material. The implements in flint and stone are exceedingly numerous. Mr. Robinson also acquired by purchase the antiquities gathered together by the late Mr. Edward Wood, of Richmond, whose geological treasures we already possess through the kindness of our esteemed V.P., Mr. Wm. Reed. He bought also many pre-historic remains from Denmark, America, and other countries, all of which have come to us. Around these there is a wide fringe of miscellaneous objects, illustrative, many of them, of the industries pursued in the Richmondshire Dales. We have acquired also from the same generous donors numerous specimens of weapons and armour, in which the Museum was singularly deficient. It must also be mentioned that the curiosities are accompanied by the cases which contained them, and by this thoughtful kindness the resources of the Museum will not be materially taxed to provide additional accommodation. The Society has every reason to congratulate itself on the very great and valuable additions which have been made to the Department of Antiquities during the past year.

The Curator of BRITISH ORNITHOLOGY has to report the capture of one very rare visitant to our shores. The American

Bittern (*Ardea lentiginosa*, Yarrell and Gould, *Botaurus mokoho*, Selby), shot by the Honorable W. Dawnay, Harlsey Hall, near Northallerton, on October 27th, 1882. He had not heard of this bird since 1804, when one was shot near Frome, now preserved in the British Museum.

Common Buzzard shot at Allerton, May 26, 1882; Spotted Crake, September 20, Askham; Little Auk, October 27, Harrogate; Peregrine Falcon, November 24, Eserick; White Fronted Wild Goose, East Cottingwith, October 27; Waxwing, shot at Acaster, December 19, 1882; Common Bittern, near Hull, December 22.

He has to thank Mr. Edward Allen, Bird Preserver, Feasegate, for the information he has kindly received from him.

CONCHOLOGY.—The principal work in this department has been the arrangement of a series of fresh-water Mussels from the Rivers of North America. They were presented some years ago by Mr. Clarke, of Cincinnati, and form an interesting and beautiful collection.

ENTOMOLOGY.—At the desire of the late Curator, the Rev. W. C. Hey has devoted some time and attention to the re-arrangement of the foreign Coleoptera. This work is at present in hand.

The Curator of the Department of MINERALOGY has nothing to report. There has been no change in the arrangement of the remainder of the collection. The Curator hopes to do this, and also to add some necessary specimens in the course of the present year.

BOTANICAL Curator's Report.—The various British Herbaria have been examined and found in a good state of preservation. W. H. R. Read, Esq., has kindly presented to the Society 30 valuable Plants, consisting of Palms of different varieties, some ornamental Foliage Plants and hardy herbaceous ones.

In the COMPARATIVE ANATOMY Department the additions have been of a minor character, but the collection which was recently re-arranged is in good order.

METEOROLOGY.

The Meteorological Records for 1882 shew little that is unusual and exceptional.

The Mean Shade Temperature was high, namely, 48·8°, which is above the Means of the preceding 14 years; but the extreme readings were never excessive, the highest being 75·3 on August 6th, and the lowest 16° on December 12th, giving a range of 59·3 degrees.

The mean height of the Mercurial Column amounts to 29·885 inches, which is slightly above the average. An unusually high reading (30·894) was observed on Jan. 18th, which has not been equalled since 1854. The Barometer remained high during most of the month, and February is also noticeable for its high pressure, the mean height being 30·146. The range of pressure during the year was from 28·804 on March 1st, to 30·894 on January 18th, shewing a fluctuation of 2·09 inches.

The Rainfall of the year has been excessive, the quantity measured being 33·15 inches, which fell during 212 days. The average Rainfall is about 24 inches, but in 1877 it reached 33·27. The early months, January, February, and March, were distinguished by their dryness, also May and September, the Rainfall being less than two inches in each of them; but in April, October, and December the Rainfall was high, exceeding four inches. The heaviest rain occurred on December 6th, when it amounted to 1·45 inches.

Mr. Henry Richardson has sent us his Records of the Rainfall at Cherry Hill, York, (total, 32·94), and at Ilkley, (total, 48·12). The latter place is 640 feet above sea level, and its average Rainfall is 36·38 inches.

The Record of the Winds of 1882 shews nothing very unusual. There was less North wind (50 observations) than last year, while the South (149 obs.) and West (137) winds have predominated.

Auroral lights were observed in York on the 12th, 13th, 14th, 15th, 17th, 18th, and 19th of November, that of the 17th being of great splendour.

The River Ouse has not been frozen over during the year. On two occasions in December the water rose 10 feet or more above summer level.

METEOROLOGICAL REGISTER, YORK, 1882.

Based on observations taken at the Museum at York at 9 a.m. and 9 p.m. each day, local time. The self-registering thermometers were read at 9 p.m., and the readings entered to the day on which they were made, while the Rainfall was measured at 9 a.m., and the amount registered entered to the *preceding* day.

BAROMETER.				RAIN.		THERMOMETER.				
Month.	Highest.	Lowest.	Mean.	Inches.	Days.	Average Maximum.	Average Minimum.	Mean Temp.	Highest.	Lowest.
	Inches.	Inches.	Inches.			Deg.	Deg.	Deg.	Deg.	Deg.
Jan.	30·894	29·038	30·277	1·49	13	45·7	35·8	40·8	53·0	28·0
Feb.	30·726	28·873	30·146	1·27	8	48·0	37·5	42·8	55·0	27·0
Mar.	30·567	28·804	29·906	1·79	14	53·2	37·9	45·6	64·2	29·0
April	30·520	28·231	29·774	4·15	17	58·6	39·0	46·3	64·8	29·6
May	30·509	29·299	30·058	1·49	12	62·0	42·1	52·1	70·5	32·5
June	30·403	29·306	29·853	3·25	17	64·4	47·8	56·1	73·4	38·7
July	30·433	29·158	29·797	3·74	23	67·5	51·9	59·7	74·0	44·0
Aug.	30·304	28·999	29·856	2·35	20	67·5	51·2	59·4	75·3	44·0
Sept.	30·461	29·266	29·861	1·20	16	62·2	45·5	53·9	68·5	37·6
Oct.	30·616	29·133	29·845	4·84	25	55·5	45·4	50·5	68·4	33·2
Nov.	30·212	28·997	29·612	2·71	24	46·4	36·5	41·5	59·8	24·0
Dec.	30·249	28·919	29·635	4·87	23	40·5	33·6	37·1	55·0	16·0
Year	30·894	28·804	29·885	33·15	212	55·5	42·0	48·8	75·3	16·0

NOTE.—The Barometer readings have been corrected and reduced to 32° F. at the Mean Sea Level.

RAINFALL AT YORK, 1882.

Month.	Total Depth.	Greatest Fall in 24 Hours.		Days on which 40 or more fell.	At Cherry Hill, York.	At Hilley.
	Inches.	Depth.	Date.		Inches.	Inches.
Jan.	1.49	.67	29	18	1.49	3.81
Feb.	1.27	.67	26	8	1.24	2.60
Mar.	1.79	.45	25	14	1.85	4.7½
April	4.15	.95	13	17	4.01	5.66
May	1.49	.43	26	12	1.32	1.47½
June	3.25	.78	22	17	3.44	5.6
July	3.74	.47	27	23	3.73	4.1
Aug.	2.35	.34	29	20	2.34	2.54½
Sept.	1.20	.20	1 & 12	16	1.24	2.66
Oct.	4.84	.75	24	25	4.95	5.10
Nov.	2.71	.31	8	24	2.65	6.95
Dec.	4.87	1.45	6	23	4.68	4.17½
Year	33.15	1.45	Dec. 6	212	32.94	48.12

HEIGHT OF RIVER OUSE, 1882.

January..	..	..	Various heights from 4in. above Summer level to 9ft. 3in. (4th).
February	..	..	From S. L. to 6ft. (27th).
March	..	..	From S. L. (10 days), to 9ft. (2nd).
April	..	..	From S. L. (8 days), to 8ft. 10in. (15th).
May	..	..	Principally S. L., highest, 7ft. 6in. (1st).
June	..	..	Principally S. L. to 24th, highest, 4ft. 6in. water off 25th to 1st July.
July	..	..	S. L. 9 days, remainder various, highest, 3ft. 9in.
August	..	..	Principally S. L., highest, 1ft. 4in.
September	..	..	Principally S. L., highest, 1ft. 4in.
October	..	..	To 14th various, highest, 3ft. 2in., water off 15th to 19th, remainder various, highest, 6ft. 4in. (25th).
November	..	..	Various, highest, 9ft. 7in. (6th).
December	..	..	From 3in. (16th) to 10ft. 10in. (30th).

HEIGHTS IN DECEMBER.

					feet.	inches.
18th	..	..	..	..	9	3
19th	..	..	..	..	10	0
20th	..	..	..	..	9	2
21st	..	..	..	..	9	0
22nd	..	..	..	..	9	10
23rd	..	..	..	..	8	2
28th	..	..	..	..	9	10
29th	..	..	..	..	9	4
30th	..	..	..	..	10	10
31st	..	..	..	..	5	0

STATION, YORK, 1882.

WIND SUMMARY:—NUMBER OF OBSERVATIONS UNDER EACH POINT.

MONTHS.	NORTH	N.N.E.	N.E.	E.N.E.	EAST	E.S.E.	S.E.	S.S.E.	SOUTH	S.S.W.	S.W.	W.S.W.	WEST	W.N.W.	N.W.	N.N.W.	Calm.	Variable.
January ..	0	0	0	0	3	1	1	4	19	8	2	4	17	0	1	0	2	
February ..	2	0	0	1	2	0	1	3	17	4	5	1	13	3	3	0	1	
March ..	2	0	0	0	1	0	0	1	10	3	7	8	20	4	3	3	0	
April ..	5	4	2	5	9	3	3	3	8	3	1	4	5	1	1	3	0	
May ..	5	3	3	4	8	1	4	3	13	1	0	1	8	0	3	4	1	
June ..	3	1	0	1	5	1	0	1	12	1	5	8	5	5	5	7	0	
July ..	2	0	1	1	0	0	0	2	17	6	15	4	10	2	0	2	0	
August ..	1	0	0	0	2	2	1	3	9	3	3	2	20	9	6	0	1	
September ..	5	1	3	4	2	2	0	4	12	2	4	1	10	2	5	2	1	
October ..	2	1	6	3	11	1	4	5	15	0	1	1	7	2	1	1	1	
November ..	8	0	2	2	2	0	1	4	7	5	3	6	13	3	0	4	0	
December ..	15	3	3	1	3	3	2	2	10	2	1	1	9	1	1	5	0	
Sums ..	50	13	20	22	48	14	17	35	149	38	47	41	137	32	29	31	7	

The following Evening Lectures have been delivered in the Theatre of the Museum :—

February 21st	On "The Atlantic Ocean," by The Rev. G. Rowe, M.A.
March 7th	On "The Upper Cambrian Rocks," by W. Keeping, M.A., F.G.S.
„ 21st	On "The Life History of a Raindrop," by A. S. Read, B.A., F.G.S.
April 4th	On "The Upper Cambrian Rocks and their Fossils," by W. Keeping, M.A.
„ 18th	On "Lakes and their Natural History," by Professor P. M. Duncan, F.R.S.

Mr. Keeping has given a number of demonstrations in the Museum on the Tertiary Fossils, as follows :—

July 11th	"On the English Fens."
„ 25th	"Some of the Pre-historic and Pleistocene Bones exhibited in wall cases 15—24."
Aug. 8th	"Caves and their contents."
„ 29th	"The Crag of Suffolk and its fossil contents."

Also he has conducted excursions of Members to the following places of Geological interest—Strensall (deep boring), Settrington, Castle Howard, Hutton.

The following papers were read at the Monthly Meetings :—

March 7th	"The forms, distribution, and habits of Fresh-water Mussels in the York Rivers," by the Rev. W. C. Hey, M.A.
April 4th	"The Roman Statue found in York," by the Rev. C. W. King, M.A., Trinity College, Cambridge.
Nov. 7th	"Some Facts and Theories about our Banded Snails," by the Rev. W. C. Hey, M.A.
Dec. 5th	"On the Geology of the Sections exposed in the new Railway Cuttings at Drewton, near South Cave," by W. Keeping, M.A., F.G.S.

The Society has lost by death during the past year 15 Members, by resignation, 11, and 2 Lady Subscribers have also resigned, whilst 16 New Members, 4 Lady Subscribers, and 6

Temporary Members have been admitted. Amongst deceased Members the names of the Venerable Archdeacon Hey, W. C. Anderson, Esq., Dr. Shann, the Rev. George Rowe, and the Rev. R. Daniel stand prominent, and their loss will be deeply felt by the Society. The Venerable Archdeacon Hey had been a Member of our Society for upwards of forty years. In the year 1841 he became a Member of the Council, and a few years afterwards he was elected to the office of Vice-President, which he held at the time of his death. During that long period he was ever the good friend of our Society in promoting its usefulness and assisting in the management of its affairs. Although his time up to the close of his life was largely drawn upon in discharging the varied duties connected with the offices and dignities which he held in the Church, he ever took a deep interest in all matters of Science connected with the Society, and his loss is felt as a great one among many kindred Societies in the City of York, as well as in the Church in which he presided so ably as one of the Archdeacons of this large Diocese.

Dr. Shann was a Member of our Council at the time of his death, and had on previous occasions discharged the same office. He filled many honourable offices in the City of York, was Honorary Physician to the York County Hospital, and a Justice of the Peace for the City. During a long life he was held in the highest esteem by his fellow citizens, and his loss will be deeply felt amongst the poor of the city to whom at all times he was a benefactor, attending to their wants in the most generous manner.

W. C. Anderson, Esq., like the preceding member Dr. Shann, belonged to the Medical Profession and was a native of York. At the first outbreak of the Cholera in 1831 he greatly distinguished himself by his zeal in alleviating the sufferings of the poor during the continuance of the pestilence. He afterwards became connected with the York School of Medicine, and for many years, and during the time of its continuance, was one of the Lecturers there. Upwards of twenty years ago he became a Member of the Yorkshire Philosophical Society and was always ready to lend a helping

hand in promoting its welfare. In 1853 he was elected by his fellow citizens to discharge the office of Sheriff for the City of York, and was subsequently appointed by the Lord Chancellor one of the Justices of the Peace for the same City. He was on more than one occasion a member of our Council.

The Rev. George Rowe, the late Principal of the York Training College, during his residence in York was an active member of our Society. He had on several occasions served on our Council and had taken a very active interest in all that concerned it. He had from time to time given various Lectures to the Members of the Society which were highly appreciated, and at the time of his death he filled the office of Honorary Librarian to the Society, and only a short time before his death he had taken steps to draw up a scheme for its better management and usefulness. Mr. Rowe was for many years the acting Secretary of the Yorkshire Architectural Society, the transactions of which contain many valuable papers of his on Ecclesiological and Antiquarian subjects. Mr. Rowe's death was sudden and unexpected, and his loss will be deeply felt in this Society, and amongst a large circle of friends.

The Rev. R. Daniel for many years discharged the office of Head Master of Archbishop Holgate's School in this city. He also on more than one occasion had been a member of our Council, and actively concerned himself in its affairs. He died at a good old age respected and honored by all with whom he had been brought in contact.

The Council propose for election as Vice-President in the room of the Venerable Archdeacon Hey, deceased, the Very Reverend the Dean of York. The Council propose for election as new Members of the Council, the Rev. M. R. Bresher, the Rev. T. B. B. Ferris, Dr. Tempest Anderson and T. Gough, B. Sc., in the room of the Rev. T. Adams, Edwin Wade, Esq., J. L. Foster, Esq. and W. L. Barnby, Esq., who retire by rotation; and W. Atkinson, Esq., in the room of the Very Rev. the Dean of York, nominated a Vice-President of the Society; and John Teasdale, Esq., M.A., in the place of Dr. Shann, deceased. The latter two are only elected for one year, but are eligible for re-election.

INCOME.		£.	s.	d.	£.	s.	d.
<i>Subscriptions:</i>							
Members	660	0	0				
County Members	43	0	0				
Lady Subscribers	71	0	0				
Associates.....	19	0	0				
Temporary Members ..	6	0	0				
Arrears	8	5	0				
<i>Admission Fees:</i>							
Paid in Full	15	0	0				
Paid by Instalments....	27	0	0				
Keys of Gates.....	62	15	0				
Compositions in lieu of Subscriptions				912	0	0	
<i>Rents:</i>							
Mr. Sykes, Bootham and Marygate Towers	34	0	0				
Mr. Burton, Swimming Baths	40	0	0				
Boating Club	5	0	0				
Fine Art Society	2	0	0				
Water Works Co.	0	1	0				
				71	1	0	
Hire of Tent				43	1	4	
Meteorological Department				15	12	0	
Whitenside Admissions after deducting Expenses.. ..				4	13	5	
Gate Money				293	13	6	
Catalogues and Photographs.....				15	13	6	
				£1355 14			

Permanent Debt:		
Yorkshire Insurance		
Company	1900	0 0
Due to Two Members, 100	0	0
	<u>2000</u>	<u>0 0</u>
		£3583 14 9

EXPENDITURE.		£. s. d.	£. s. d.	Cr.
Crown Rent			1	0
Corporation Rents			19	11
Rates and Taxes.....			26	10
Water Rates.....			5	2
Insurance			5	2
<i>Salaries and Wages :</i>				
Mr. Keeping	200	0	0	
Mr. Guy	25	0	0	
Mr. Fielden	60	0	0	
Miss Baines	39	0	0	
John Davison (Pension) ..	26	0	0	
Attendants, Museum ..	63	16	0	
Do., Hospitium ..	26	0	0	
Gardeners.....	149	15	0	
			569	11
Interest to Insurance Com- pany, less Tax.....	74	3	10	
Interest to Bankers	81	6	9	
			155	10
<i>General Expenses and Repairs.</i>				
Museum and Hospitium..	86	15	0	
Dove & Sons for fitting windows and doors with Iron bars	28	17	8	
			115	13
Estate			23	11
<i>Gardens :</i>				
General Expenses & Repairs	45	6	8	
Seeds	4	19	6	
Coal and Coke, &c.	13	16	2	
			64	2
Grass, Soda, Carting, Shrubs, and New Sept. &c., for New Ground adjoining St. Mary's Lodge			34	9
Library: Books and Binding.....			27	12
<i>Miscellaneous :</i>				
Printing and Stationery			29	6
Printing Reports	11	10	0	
Do. Circulars and com- munications to Mem- bers	9	3	0	
Postage of ditto	18	10	1	
			39	3
Coals, Gas, &c.			41	6
Bands			9	12
Purchase of Antiquities, &c.			61	3
Repairs, Carriage, and fixing Tent ..			20	1
Meteorology			15	12
Lectures			12	13
			1296	14
Excess of Income over Expenditure			59	0
			£1355	14

Permanent Debt:			
Yorkshire Insurance			
Company	1900	0	0
Due to Two Members,	100	0	0
	<u> </u>	<u> </u>	<u> </u>
		2000	0 0
			<u> </u>
			£3583 14 9

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NEW MEMBERS.

Brown, Rev. Wm., *St. Wilfrid's*.
 Crawhall, George, *Burton Croft*.
 Cunningham, Major C., *The Crescent*.
 Dodsworth, E. R., *St. Peter's Grove*.
 Dale, R. P., *Burton Cottage*.
 Hey, Rev. John, *Clifton Villa*.
 Hotham, Miss C., *St. Leonard's*.
 Leng, J. P., *Coppergate*.
 Relph, Assistant Commissary General, *Grosvenor Terrace*.
 Smith, Rev. Thos., *Clifton*.
 Scholfield, Miss, 4, *St. Leonard's*.
 Scott, John, *Lord Mayor's Walk*.
 Thorp, H. B., *Clifton*.
 Walker, Col. D. C., *Club Chambers*.
 Watson, Mrs., *Faversham Terrace*.
 Wigglesworth, R., *York*.

LADY SUBSCRIBERS.

Blanshard Miss, 26, *Castlegate*.
 Daniel, Mrs., *Grosvenor Terrace*.
 Dodsworth, Miss, 3, *Museum Street*.
 Thomas, Mrs., *St. Mary's*.

RESOLUTIONS

PASSED AT THE ANNUAL MEETING, FEBRUARY 6th, 1883.

1. That the Report of the Council now read be adopted and printed for circulation amongst the Members, Lady Subscribers, and Associates.
2. That the thanks of the Society be given to the Members of the Council retiring from office, also to the Treasurer, Secretary, and Curators for their valuable services; and that authority be given to the Council to give admission to the public to the Museum on Whit-Monday and Tuesday, under the same regulations as last year.
3. That the thanks of the Meeting be given to the Chairman.

DONATIONS TO THE MUSEUM AND LIBRARY.

LIBRARY.

BOOKS PRESENTED.	DONORS.
The Journal of the Linnæan Society....	Mr. W. H. Rudston
Report of the Whitby Literary and Philo- sophical Society	Read, M.A.
Atti della Reale Accademia dei Lincei ..	The Society.
The Journal of the Chemical Society ..	The Academy.
Memoirs of the Geological Survey of) India, ser. xiv., Duncan & Sladen....)	The Chemical Society.
Address at the Anniversary Meeting of the Norwich Geological Society by) J. H. Blake, F.G.S... ..)	The Indian Govern- ment.
A Chapter in the Life History of an Old University, by the Rev. Professor Bonney, F.R.S.....	The Author.
Report of the Meteorological Council, 1880—1	The Author.
Sur la délimitation et la constitution de l'étage houiller inférieur de la Belgique par le Dr. J. C. Purves	The Meteorological Council.
Catalogue of books added to the Radcliffe Library during the year 1881.....	The Author.
The Transactions of the Linnæan Society of London, Botany, vol i., pt. ix., vol. ii., pt. i.; Zoology, pt. ii., iii. & iv.)	The University of Ox- ford.
Geology of India, part iii.; Economic Geology, by V. Ball, M.A.	Mr. W. H. Rudston
Records of the Geological Survey of India, 2, 3, 4, 1881	Read, M.A.
Memoirs of the Geological Survey of) India, vol. xviii., 1, 2, 3	The Indian Govern- ment.
Palæontologia Indica, 2 vols., by Waagen and Feistmantel	The Indian Govern- ment.

BOOKS PRESENTED.	DONORS.
British Fossil Cephalopoda, part I., by Rev. J. F. Blake	Mr. Wm. Reed, F.G.S., Blake Street.
Fresenius' Chemistry	Mr. Wm. Reed, F.G.S.
Engravings of the Ancient Marbles in the British Museum	The British Museum.
Barrande's "Acephales"	The Author.
Transactions of the Royal Society of Edinburgh	The Royal Society.
British Conchology, vols. i.-v., G. Jeffrey	Mr. Wm. Reed, F.G.S.
Memoirs of the Geological Survey of Great Britain, vols. i.—xiii.	Sir A. Ramsay.
Annual Report of the British Museum..	Museum Council.
Report of the Scarborough Philosophical and Archæological Society, 1881	The Society.
Smithsonian Report, 1880	The United States Government.
Seven Photographs of the remains of large New Zealand Birds	Prof. T. J. Parker, Otago University, Dunedin.
Transactions and Report of the Council of the Leicester Literary and Philosophi- cal Society	The Society.
Report of the Norwegian North Atlantic Expedition, vols. iv. and v.....	The Norwegian Govern- ment.
Geological Papers by Walter Keeping, M.A.	The Author.
Annual Report of the Leeds Literary and Philosophical Society	The Society.
Meteorological Reports, viz.: The Storm of October, 1881; Observations at Stations of 2nd Order, 1879; Reports on the Neighbourhood of the Cape of Good Hope	The Meteorological Society.
Proceedings of the Norwich Geological Society	The Society.
Proceedings of the Warwickshire Field Club	The Society.
The Ventriculidæ of the Chalk, by J. Toulmin Smith	Miss Toulmin Smith.
The Calendar of the Yorkshire College..	The College.

BOOKS PRESENTED.

DONORS.

Catalogue of the Antiquities at Alnwick Castle (Illustrated), and Catalogue of the Egyptian Antiquities at Alnwick Castle, 2 quarto vols.	The Duke of Northumberland.
The Proceedings of the Royal Institution of Great Britain, vol. ix., parts 4, 5 ..	The Royal Institution.
The Journal of the Chemical Society....	The Society.
Bulletin of the United States Survey of the Territories, vol. vi., No. 3	The United States Government.
Dana's Manual of Geology, 3rd Edition	Wm. Reed, Esq., F.G.S.
List of Correspondants of the Smithsonian Institution, 1882	The Smithsonian Institution.
Contributions to the Meteorology of the Arctic Regions	The Meteorological Council.
Report on the Gales Ocean District	The Meteorological Council.
"Geodätische Arbeiter," vols. i., ii., iii., and "Vaudstand's Observationer," vol. i.	The Norwegian Government.
The Anne'ida of the Norwegian North Atlantic Expedition, and the Holothurida	The Norwegian Government.
The "Quarterly Weather Report," 1879. Appendices and plates, and "Hourly Readings," January to March, 1881 ..	The Meteorological Society.
Memoirs, vol. xix., pt. 1, and Records, vol. xv., pts. 1—3, of the Geological Survey of India; also Palæontologica Indica, ser. x., vol. ii., pts. 1—3, and series xiv., vol. i., pt. 3 (Fase. 2)	The Indian Government.
Geological and Geographical Atlas of Colorado, and adjacent Territories, by Dr. F. C. Hayden.....	The United States Government.
Report of the Meteorological Council to the Royal Society, 1882	The Meteorological Society.
Instructions for Meteorological Telegraphy, 1883.....	The Meteorological Society.

MUSEUM.

GEOLOGICAL DEPARTMENT.

	DONORS.
Vertebra of an <i>Ichthyosaurus</i> from Market Weighton	Mr. J. S. W. Kirkpatrick.
Specimens of Mollusca from the Inferior Oolite	Mr. J. F. Walker, M.A., Gillygate.
Several <i>Ammonites</i> and other fossils from the Kelloway Rock of Drewton cutting, near S. Cave	Mr. A. J. Barry.
A stalagmitic deposit from a ditch at Sutton, near Thirsk	Mr. F. Rawling, Sutton.
A series of Brachiopods from the Wenlock shale of Buildwas and Tickwood, Salop	Mr. J. F. Walker, M.A.
Tusk of a Hippopotamus, from the gravel at Nunnington	Rev. Canon Raine, M.A. D.C.L.
Section of tooth of <i>Elephas</i> and tooth of Mastodon	Rev. E. A. Healey, Copmanthorpe.
107 specimens from the Middle Lias of Grosmont	Mr. Wm. Reed, F.G.S.
A large Sponge, "petrified" by the springs at Knaresborough	W. H. Huddleston, Esq., Cheyne Walk, Chelsea.
Fossils from the Kimmeridge clay of Thornton-le-Dale, also from the Lias and Lower Calcareous grit	Mr. G. Edson, Malton.
<i>Carpolithes Bucklandi</i> , a fruit from the Coralline Oolite of Malton	Mr. Jackson, Malton.
Four species of Shells from the Kelloway rock of S. Cave	Mr. C. S. Middlemiss, B.A., Hull.
A <i>Calamite</i> Stem from S. Kirby, near Pontefract	Mr. C. D. Wolstenholme
<i>Ammonites capricornis</i> and other fossils from the new railway cutting near Brough (Hull and Barnsley line)	Mr. J. E. Jones, South Cave.
Two <i>Ammonites</i> from the Oxford clay, and a cast of <i>Calymene Blumenbachii</i> ..	Rev. E. A. Healey, Copmanthorpe.
Fibrous Gypsum from the Drift at Gate Helmsley	Mr. F. Wright, Stamford Bridge.

DONORS.

- Septarian Concretion from Settrington, { Rev. I. Taylor, M.A.,
Settrington.
- Fossil Echini and Brachiopods from
the Upper Chalk, near Six Mile
Bottom, Cambridgeshire {
- A series of Rocks from Norway, and
Fossils from the Cambrian Rocks of
Malmö and Christiania { Mr. W. Keeping, M.A.
- Fossils from many Yorkshire localities,
including the Lias of the coast of Gros-
mont and Cliffe, the grey and yellow
sand series of the Peak and Glazedale,
the Kelloway Rock of the Cave district,
etc., collected by Mr. W. Keeping, M.A.
- A choice and important selection of Fossil
Sponges, Echinoderms, Mollusca, etc.,
from the chalk of Yorkshire { Mr. S. Chadwick,
Malton.

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ZOOLOGY.

- Several Skulls of Turtles, Camel, and Bos { Dr. T. Anderson, Stone-
gate.
- Two Recent Corals { Dr. C. H. Dunhill,
Minster Court.
- Procellaria puffinus, the Manks Shear-
water { Rev. C. R. W. Waldy,
M.A., Sutton-on-Der-
went.

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BOTANY.

30 Plants have been presented to the Society by W. H. Rudston
Read, Esq., namely :—

PALMS.

- | | |
|--------------------|-------------------|
| Brahea filamentosa | \| Chamærops humilis |
| Corypha Australis | \| Phoenix rupicola |
| Livistona sinensis | \| Seforthia elegans |

ORNAMENTAL FOLIAGED PLANTS, ETC.

Coleus "Allan Chandler"	Pandanus utilis
„ "Glorie de Monceux"	Asplenium Fabianum
„ "Nimrod"	Gloxinias (seedlings)
„ "Lovely"	Lantana "Gizelle"
„ "The Queen"	„ "Ver Luisant"
Abutilon Reine d'or	„ Reveil
Begonia, tuberous rooted	Begonia insignis

HARDY HERBACEOUS PLANTS.

Veronica Guthriana	Phlox setacea atropurpurea
Auriculas (alpine)	Saponaria ocymoides splendens
Delphiniums (of sorts)	Tiarella cordifolia
Primula Sieboldii alba	Primula Sieboldii
Dahlia Cervantesii	Dahlia coccinea

ANTIQUITIES.

DONORS.

Two poisoned Arrow Heads	Mr. J. S. W. Kirkpatrick
A curious Leadon Weight, found at Langton, and two Heads in pottery, probably from Cyprus	Rev. C. B. Norcliffe. Langton Hall.
A fine fluted Urn, found in Newington Place	Mr. C. N. Wilkinson. Newington Place.
A box of ancient Gold Weights & Scales	Mr. George Acton, Low Ousegate.
Anglian Spear Head and Knife, from Londesborough	Lord Londesborough.
Several Anglian Implements in bone, found in Davygate	Mr. Alderman Melrose. Clifton Croft.
A pair of silver Shoebuckles and a De- narius of Philip	Mr. H. Preston, Bootham Terrace.
Seven bronze Medals and a silver coin of Alexander VIII.	Major J. A. Barstow, Garrow Hill.
Pottery and other curiosities found under his house in Petergate	Rev. C. B. Norcliffe, Langton Hall.
A Nurembergh token or counter	Mr. W. W. Hargrove, Clifton.

DONORS.

A large Stone Weight, with handle inscribed H. S., 1686	Mr. Hugh Christie, Melbourne.
A curious Chain found recently under the Union Bank	Mr. St. Clair Carnegy, Union Bank.
Two Gold Weights and a Medal commemorating the anniversary of the Revolution of 1688	Mr. J. F. Walker, M.A., Gillygate.
Thirty-five bronze prehistoric Implements and Weapons, consisting of axes, palstaves, daggers, etc., from England and Ireland; also several Implements of Stone of the same period from the West Riding of Yorkshire	
Two very fine bronze Roman Bowls, found early this century at Finningley, near Doncaster. Within each there is another of a thinner material, with a jimped edge, as if to protect it	
A finely-ornamented patera of Samian Ware from York, with many potter's marks on Ampioræ, Mortaria, and Samian vessels	
A Torch-Stand, two Vessels, and a Lamp, from Trier, all of bronze and of Roman work	Mr. Edward Hailstone, Walton Hall, Wakefield.
Six very fine Roman Vessels from Trier, two of which have inscriptions around them in white slip	
Fourteen Vessels of Romano-Greek Ware	
Three Lamps from Carthage, with the Christian monogram upon them, and two Charms against the Evil Eye, from Trier	
Two Danish Combs found in York, and two mediæval Vessels from the same city; another Vessel from the moat at Walton Hall	
A very fine Circlet from Ireland, covered with interlacing work and rich ornamentation	

DONORS.

- A collection of nearly forty brass Matrices
of Seals, chiefly foreign ; a large num-
ber of original impressions of the
Royal Seals of England, and a very
large quantity of Doubleday's casts of
English and other Seals } Mr. Edward Hailstone,
Wakefield.
- The Skull of Theodorianus of Nomentum,
taken out of a stone coffin found on the
Mount circa, 1800. The inscribed
Coffin is in the collection of the Society } Mr. W. Driffield,
Huntington.
- A Roman Urn, ornamented with a hunt- } Lady Clark, South
ing scene, found in Blossom Street.... } Parade.
- Two Bullets, a Glass Bead, etc., found
at St. Michael-le-Belfrey when it was
restored } Rev. C. B. Norecliffe,
Langton Hall.
- A British Stone Axe, perforated, found } Dr. A. H. Leadman,
at Norton-in-the-Clay } Borobridge.
- The George Alderson Robinson collection of Antiquities, etc.
(See page 10).
- Heliostatic Clock Mr. Foljambe.

SERIAL WORKS SUBSCRIBED FOR.

- Birds of Asia, by John Gould, F.R.S.
Natural History of the Tineina, by H. T. Stanton, F.R.S.
Nautical Almanack.
Proceedings of the Zoological Society.
Publications of the Palæontographical Society.
Publications of the Ray Society.
Sowerby's Thesaurus Conchyliorum.
London, Edinburgh, and Dublin Philosophical Magazine.
Annals and Magazine of Natural History.
Geological Magazine.
Journal of the British Archæological Association.
Numismatic Chronicle.
Memoirs de la Société Paléontologique Suisse.
D'Orbigny's Paléontologie Française.
Geological Record.
Nature.
Surtees Society, the Publications of.
Hardwicke's "Science Gossip."

COMMUNICATIONS
TO THE
MONTHLY MEETINGS
OF THE
YORKSHIRE PHILOSOPHICAL SOCIETY,
1882.

MARCH 7th, 1882.—The Rev. W. C. HEY, M.A., read the following paper on “Fresh-water Mussels in the York Rivers.” The Ouse and the Foss, which unite just below York at the spot known as the Blue Bridge, are rivers of very different character, much more so than the superficial observer would suppose. The Ouse is a wide, deep, and generally rather a rapid river, sometimes, in floods, almost a torrent. The Foss is a narrow river, naturally shallow, though in parts deepened artificially, and the current flows so gently that often the water is practically stagnant. Again, the Ouse has a very bare channel somewhat hard and stony in places, and even where the bottom is soft and sandy there is no vegetable growth. But the Foss has a bottom of rich soft mud, where the flags and the water-lilies root themselves and flourish luxuriantly. In places the river is quite overgrown with tall rushes in summer time. Again, the Ouse receives a good deal of drainage, the Foss not much, except one very poisonous kind, viz., that which escapes the Gas Works. Once more, near York the Ouse has no locks. This is a very important point to notice in regard to the distribution of species. But the Foss has three locks within the space of as many miles viz., Castle Mills Lock, Yearsley Lock, and Huntington Lock. Asking you to bear in mind these points of contrast between the Ouse and the Foss, I go on to make a few remarks on the genera and species of mussels found in these rivers. The family of *Unionidæ* or freshwater mussels is represented in England by two

genera, viz., *Unio* and *Anodonta*. This is the distinction between them. In *Unio* the hinge, or point upon which the valves work, is supplied with projections known as teeth, and corresponding receptacles. In *Anodonta* the hinge-line is quite smooth and toothless. There are three kinds of *Unio* found in England—firstly the famous pearl mussel, which is confined to mountain streams, and therefore does not occur at York; secondly, *Unio pictorum*, so-called because painters used the shell for palettes; and thirdly, *Unio tumidus*. The last two occur in both our rivers. In the genus *Anodonta*, Jeffreys makes two species, *Anatina*, in which the hinge line is carried into a sort of crest, and *Cygnæa*, which has the hinge line almost parallel with the other edge of the shell. This distinction, however, is difficult to preserve; one form passes by imperceptible grades into another. Both forms occur abundantly at York. The mussels can be collected in plenty only when the locks are open. The water then sinks sufficiently low to disclose large numbers of them sticking in the soft banks. When Naburn Lock is opened that small portion of the River Foss (only some 200 yards in length) which lies between Castle Mills Lock and the Blue Bridge is almost drained. Very near the mouth of the Foss occurs a number of mussels belonging to the species *Anodonta anatina*. They are remarkable for possessing a beautiful ornamentation of rich green rays. The epidermis is lustrous, the interior highly pearly. Now, by walking a few yards we find ourselves following the bank of the Ouse. Here occurs the very same form of *Anodonta*, but how changed in appearance! Instead of a lustrous green epidermis the shell is of a dark dead brown colour, the pearlyness of the interior is quite dull, and the phenomenon of erosion, or the eating away of the epidermis and upper layers of the shell, is extensively developed. Erosion is caused by the presence of carbonic acid or by the rapidity of the current of water. Probably the former has caused the disfigurement of the Ouse *Anodontas*, owing to the drainage matter present in the river just below York. Exactly the same contrast is shown in the specimens of *Unio pictorum*, from the same two localities, with the additional distinction that the Ouse specimens have a slightly curved form, and belong to the

variety termed *curvirostris*. Between Castle Mills Lock and Layerthorpe Bridge *Anodonta* are more or less abundant, but they no longer present the beautiful radiated colouring which distinguishes the Blue Bridge specimens. Drainage affects the colouring unfavourably, but in certain parts improves the size. There was, and perhaps is still, a spot where warm water was discharged into the river. At this point the shells were observed to be larger and more delicate than elsewhere, exemplifying the general effect of heat upon forms of life. At Layerthorpe Bridge shells cease to exist in the river. This is due to the poisonous matter percolating through the banks from the Gas Works. However, immediately above Monk Bridge, another species of *Unio* appears, and is more or less abundant from that spot up to Yearsley Lock. This species is *Unio tumidus*; and what is remarkable about it is that it appears in two forms—one a thick, dark brown wedge-shaped form; the other a thinner, wider, and greenish-tinted form. Why the same species should be present in two forms under exactly the same circumstances is a puzzle, for it is a generally received law that where two different forms exist under the same conditions each has a right to be elevated to the dignity of a species. And this is a law I should like rigidly to adhere to, for I conceive it to be one of the few thoroughly scientific criterions of a species. Near the bathing place in the Foss, there exists, though it is very scarce, a curious form of *Unio*, which in the "Journal of Conchology" I described as *Unio tumidus*. I now believe it to be more correctly referred to *pictorum*. The shell is large, very heavy, much truncated, and in colour a dark olive brown.

Above Yearsley Lock we find a great change in the form of the toothless mussels. The form *cygnea*, in which the sides of the shell are parallel, takes the place of the crested form, which, according to my experience, is universal in the lower reaches of the river. The colour of the shell is a clear rich olive or sepia, and the beak is much protruded. It seems strange that the locks should separate forms of shells as completely as they do, for two circumstances must be borne in mind. The first is that a good deal of water passes round by what is called the backwater, especially in flood time; and the second, that the locks were once

often opened, and have not, of course, existed from a very remote time: so that we seem here to have a striking example of the readiness with which forms of life are restricted in distribution and affected in shape and colouring. The same restriction of distribution and modification of form is exemplified in the river Foss in the case of many other species of freshwater shells. Thus a particular form of *Sphaerium lacustre* predominates only near Foss Islands, while another species, *Sphaerium ovale*, occurs nowhere within miles of York except in the tiny space between the Castle Mills Lock and Blue Bridge, and what is still more strange, had never been found either there or anywhere else in England till within late years. Mr. Jeffreys has a theory that it was imported from America, but no communication, so far as I am aware, has ever existed between our River Foss and any vessels which have crossed the Atlantic. The coal barges of the Foss would be a sorry sort of craft in which to stem the billows which roll between England and America, and I am not aware that anything larger has in modern times floated upon its waters, nor even that any American export is ever brought up the river.

A few special forms of freshwater mussels deserve notice. Just above Yearsley Lock occur some dwarfed and malformed specimens of *Unio tumidus*. This malformation I venture to attribute to the effect of the water rushing over the dam. Rapidly running water is always deleterious to the development of such shells as generally affect still waters. Near Clifton Scope occur some very thin, but bright and clean, *Anodontas*, only small in size. They are clean, doubtless because of the absence of drainage, and they are small and thin because, not only is drainage absent, which often affords rich food, but the river is very clear of vegetable matter. Near the Union, there occur in the Foss, shells of *Unio tumidus* much curved in form. They resemble *Unio margaritifera* in shape. It is curious that all our British *Unios* and *Anodontas* have a tendency to assume this form under certain circumstances.

These investigations, made over a space of a dozen years or more suggest a few general reflections. The first reflection bears on distribution; that subject which the genius of Wallace has rendered so deeply interesting. For the fact of so temporary

and incomplete an obstacle as a lock forming a boundary line between varieties, and even kinds of shells, gives us some limit about the apparently small lines of demarcation which may determine the complete range of species and even genera upon the surface of the globe. Our second reflection is upon the instability of species, and the impossibility of any cut-and-dried definition of the term. Of course a natural history which ignored species would be as absurd as a thermometer ungraduated—only species are best regarded in the same light, merely degrees marked upon the unbroken flow of life. The third reflection is how species are affected by a change of circumstances, and that, though the change is often far from being very obvious. No one would suppose that the difference in the quality of the water in the Ouse and the Foss is so great as the difference between the two forms of *Anodonta* living within a few yards of one another shows it to be. A superficial and special view of any department of natural history leads to the conclusion that Nature has, as it were, a number of moulds from which she is never tired of producing the same forms. A wider and more general view, extending to past geological epochs, reveals the great fact, that as the individual, so too the species and the genus, have their birth, their vigour, their decay, and their death, and that natures moulds themselves are as impressionable as the receiving surface of the photograph—not one external influence but evokes a corresponding modification.

APRIL 4TH, 1882.—In the absence of the Author, the Rev. CANON RAINE, M.A., read a paper by the Rev. C. W. KING, M.A., Trinity College, Cambridge, on “the Roman Statue found in York, in 1880.”—The statue of some personage arrayed in complete Roman armour, lately discovered at York, is incomparably the finest example of Roman-British workmanship that we possess, from its excellent style, exceptional magnitude, and wonderful preservation. What adds immensely to the interest of the relic is the assurance that it was the production of native skill and not an importation from a region more advanced in culture (which its merit might

otherwise cause us to suspect), for its material places this interesting fact entirely out of doubt, being the fine-grained gritstone of the actual neighbourhood.

On its intrinsic value as a monument of ancient sculpture, all critics are agreed—but as to the idea the sculptor had in view—whether a god, a tutelary genius, or a mortal—there exists a very wide diversity of opinion; and although each theory finds support in some particulars of the representation, yet each in turn is controverted by other portions of the accessories that strongly militate against it. To examine these interpretations successively, and to state the arguments suggested by the work itself for and against each of them, is the object of the present paper.

The most obvious explanation of the meaning of the figure is that we have in it the portrait of some very youthful Cæsar, represented in his proper character of “*imperator*” as best befitted the requirements of the place where it was to be honoured—the important military station of Eburacum. That such representations were usual in this island is attested by the beautiful bronze statuette of Nero haranguing his troops, 22 inches high, and exhumed at Barkinghall, in 1790, now deposited in the British Museum. The cuirass, indeed, now wants that indispensable badge of imperial dignity, the Gorgon’s head, of which Martial makes such ingenious use:—

Accipe belligeræ crudum thoraca Minervæ,

Ipsa Medusæ quem timet ira comæ :

Dum vacat hæc, Cæsar, poterat lorica vocari,

Pectore cum sacro sederit, ægis erit

Nevertheless the marks of its attachment to the metal are still perceptible. But the breast of our statue was never graced with this distinctive ornament, neither are the legs covered with the *caligæ*, that equally indispensable part of the Roman military costume, but, on the contrary, with the metal greaves of Greek Heroic times, the use of which had grown entirely obsolete in actual service long before the conquest of Britain. The Roman *imperator* invariably appeared in his statue in the same equipment as that in which he marched in front of his army, or harangued them before a battle. These two circumstances

are, therefore, sufficient in themselves to upset the first identification of the character of the statue.

The second, which makes it to be a Mars, has much to be said in its favour; but yet is open to certain grave objections that do not present themselves to the casual observer in so glaring a light as those above adduced against the previously quoted opinion, but which will be found the more difficult to rebut the more closely they are examined. It is true, indeed, that our figure still rests one hand on his shield, and the other, though now deficient, unquestionably upon his spear, in the attitude of that god when "standing at ease," as opposed to his violent action in his other characters of "*Gradivus*," and "*Propugnator*,"—but this is nearly all that can be said in support of the attribution we are now considering. The very youthful, nay feminine cast of the features, and the long flowing hair would rather bespeak a "Venus Victrix," than the ferocious Mavors of the Romans, who invariably typified their Divine progenitor as a bearded man, arrived at the maturity of his strength; and this from the earliest times as may be seen from the head of Mavors placed upon the beautiful *scriptuli* of the Republic. It is however true that the Ares of the Greeks, (and consequently, of their scholars, the Etruscans) enjoys perpetual youth upon their monuments; and the thought once occurred to me that the maker of our figure had chosen to take for his model some ancient masterpiece of the Greek school, a bronze statuette of Ares, carried about from one country to another amongst the lares of his Roman patron: just as the Table-Hercules of Alexander always accompanied Hannibal in his campaigns, and afterwards, under the Flavian dynasty, its latest possessor, Pollius Felix, (Statius, *Sylvæ*, iii. 1). Although the exceptional merit of the York sculpture would warrant our assigning it an origin of this nature, yet it exhibits certain peculiarities in the detail (hereafter to be noticed) that plainly indicate a widely different nationality and date for its execution.

The third explanation of its design, that proposed by Mr. Thompson Watkin, (*Archæological Journal* for December, 1881), is equally ingenious and seductive; and if it should

pass the test of severer scrutiny, would supply our country with a national type far more elegant and expressive than that which has so long enjoyed the same honour.

He discovers in the figure the *provincia Britannia* personified, and finds, what certainly is strong support, the base of a statue, now unhappily lost, from the same locality, bearing a dedication to that divinity; "*Britanniæ sanctæ P. Nickomedes Augg. n. n. libertus.*"

Let us now discuss the arguments supporting this view of the question, that are presented by the sculpture itself. The body-armour, it is true, is entirely Greek, or else copied from a Grecian prototype, but the shield is neither the circular Hellenic *ἀσπίς*, nor the rectangular Roman *scutum* of the legionaries, nor the small round *parma* of the cavalry. There can be no doubt that it represents the great Gallic shield of wood if we compare it with those depicted on the arms of the Gauls in the combats with them, which form a frequent reverse of the consular *denarii*, notably those of the *gens Servilia*, and which distinguished the Gallic nationality down to the close of the Empire, for Ammian notices how Julian's Gauls were enabled by their means to swim across the broad Euphrates. The coin-types shew that the distinctive feature of these shields, (like doors, *θύραι* as Diodorus Siculus calls them), was the large, hemi-spherical *umbo* in the centre, intended to protect the hand which wielded it, and which is equally conspicuous in the monument now under consideration. But the part that betrays a barbaric origin even more unmistakably than the Celtic shield, is the sword, whose pommel reaches to the left armpit of the warrior, whilst the sheath descends as low as his knees. Entirely dissimilar to the short and wide Roman *ensis*, it is the veritable *spatha* of the Gauls, "equal in length to the darts of other nations," as the same Diodorus remarked in the days of Augustus (Hist. v. 30). It is, undoubtedly, an example of the "*enormes et sine mucrone gladii*," which Agricola encountered in the hands of the Britons, and which were used for slashing at the heads and limbs of their opponents (Polyb. Hist. ii. 33), according to the regular Gallic system as described by Polybius. For the more civilised part of the natives of the island differed

but slightly in manners and customs from those of the opposite continent, whence they had come over (as Cæsar tells us); it therefore necessarily follows that the arms of the Britons, offensive and defensive, were the same as those used by the Gauls.

Another point in favour of Britannia's claim to the appropriation of this statue, in addition to the feminine face and head which it appears to exhibit, may be found in the fulness of the chest and the very peculiar (and perhaps significant) ornamentation of the cuirass, which might seem to indicate the existence of female forms beneath their covering. This last observation, however, may be objected to—for it cannot be denied that the slenderness or compactness given to the human figure depends more upon the period of art than upon the actual proportions of the model. Nothing stronger than the above-stated arguments can be advanced in support of Britannia's claims to this personification; and notwithstanding one's natural anxiety that she may gain her suit, and the proverb, "*Male verum examinat omnis corruptus iudex*," it must be confessed they are of no great weight when the arguments on the other side come to be carefully examined.

The base, above mentioned, proves, it is true, that the tutelary genius of our island was embodied in a visible form, and like Dea Roma, or the Τύχη of Antioch, received divine honours from the civilised natives, but numerous memorials of the period too clearly declare that the form under which she was worshipped differed in every respect from the one before us. Our authorities for the personification of Britannia are the coins of Antoninus Pius (apparently from their rude make struck in the island), of Hadrian, and, a century after him, of Carausius. The first depicts her as a figure in profile, seated on rocks, holding a military ensign in the right hand, and resting the left, which supports a spear, upon the edge of the great Gallic shield. The second, more artistic in design, exhibits her similarly seated, but in front face, resting her head pensively on her right hand, and the left armed as before, upon the same shield, but of even larger relative proportions, and with a long spike projecting from the *umbo*. In neither case does she wear

any body-armour, in fact as the Gauls used none, but went into battle "naked," with the shield for their sole defence, it was impossible that the Britons should have advanced beyond them in that particular, and, what proves the point, is the bas-reliefs of local workmanship (the finest being that lately found near Linlithgow), where the victorious Roman is seen careering over prostrate barbarians all in a state of nudity, for they had cast off the plaid, their only covering, on rushing into battle, as did the Highlanders in similar circumstances, or even when engaged in any hard work down to the time of the construction of the military roads after the rebellion of 1745. But most interesting of all these types is the Britannia welcoming her *soi-disant* saviour Carausius, upon his landing, with the Virgilian quotation, "*Expectate, veni.*" But in this last picture, to suit the occasion, Britannia appears, without weapons or defence, in the usual attire of a Roman matron grasping the hand of her new sovereign. The wall of rocks that first met the eyes of the invaders from the other side of the Channel was, therefore, taken for the distinct badge of Britannia, according to the rule in Roman personifications, just as Italia on the coins of the Social League is distinguished by her peculiar Samnite lance, and the reclining bull, *vitulus*, that gave her name; Hispania, by the rabbit, for the same reason; Africa, by the elephant's head; and Dacia, by the great Celtic trumpet, *carnynx*, carried in her hand. Had the York statue, therefore, been designed to typify this island, the natural distinction of the country would have, as a matter of course, found its place as an accessory, in the background, as support to the folds of the *paludamentum*.

Some may be inclined to see here Dea Roma herself, than whom no deity could have more appropriately adorned the Prætorian head-quarters in any part of the Empire—but the costume, in this case also, furnishes insuperable objections against, apparently, so satisfactory an explanation. The tutelary goddess of Rome was no other than Minerva, the Etruscan name of the Palladium, *i. e.*, statuette of Pallas-Athene, the special object of veneration to the Pelasgic founders of the City. Now, no extant type of the virgin-goddess

represents her in body-armour—the most archaic statuary agrees with Phidias in this particular, in dressing her figure in the long closely-pleated *peplos*, with no other defence than the helmet on her head and the shield held forth on her arm, and, more rarely, the *ægis* round her neck, which she borrows from her father. Such is her regular equipment in Roman art, from the early times of the Republic when her helmeted head, with title Roma is the usual obverse of the coinage, down to the fifth century, when as a neutral party between Paganism and Christianity, she is allowed in the inoffensive character of Urbs Roma to retake her place upon the *denarii*.

The only result of this long discussion is the conviction that, although it is very easy to discover what the meaning of the sculpture is not, it is impossible to decide what it is, and the reader of the foregoing discussion will have good reason to quote the reply of Plautus, "*Bene replicasti, incertior multo sum quam dudum.*"

NOVEMBER 7TH.—The Rev. W. C. HEY, M.A., read a paper on "Some Facts and Theories about our Banded Snails."

The last paper I had the honour of reading before this Society dealt with the common bivalves of our York rivers. The present paper has for its subject some of the familiar univalves of our hedgerows, commonly denominated snails. The remarks I have to put before you refer to those brightly-coloured shells which appear in such astonishing numbers, sticking to nettles or crawling over grass, when the weather is warm and damp, and vanish in an equally astonishing manner when we have a succession of very sunny or very cold days. The variation in colour of these shells is almost endless. I have gathered in Yorkshire alone about thirty very distinctly marked varieties, and an immense number of less clearly distinguished forms. Yellow or pink is usually the ground colour—sometimes left plain, sometimes decorated with one, rarely with two, often with three or more dark narrow bands. At other times one broad band runs all round. Occasionally the bands are variously interrupted, and specimens at times occur which have the bands bright red, or quite colourless. An interesting

question is afforded by considering what is the relation between the animal and its shell. The union between them is so close that although there are plenty of shell-less snails, commonly called slugs, those which possess shells perish soon after extraction, and that although there is no organic union between them.

Has the animal, one would ask, any liberty of choice in selecting the colour of its shell? A specimen I obtained at Redcar throws some light on the subject. It is a banded snail, and has been severely crushed. The snail has repaired the shell. It has retained the shape and the pink colour of the remainder of the shell, but has not been able to re-produce the brown bands. Thus, we may conclude, I think, that each snail can once, without conscious effort, produce a shell of one uniform plan; but that when, from any cause, conscious effort is called forth on the part of the animal, no elaborate previously-begun pattern can be carried out, and convenience and safety is the only thought present to the mind of the utilitarian and unæsthetic mollusc. Another specimen, obtained near Bridlington, shows that this snail can alter the spiral curve of its growth, if desirable—a phenomenon much more common, and naturally so, among the freshwater discoidal shells included under the genus *Planorbis*. The shells before us are divided into two principal groups. The first group is distinguished by the lip being coloured brown, and is called *Helix nemoralis*. The second has the lip white, and is known as *Helix hortensis*. A form with a pink lip also occurs, and has been (with doubtful propriety) called *hybrida*. Few points have been more eagerly discussed by conchologists than the right of these differently-coloured shells to rank as distinct kinds. My own view is that *nemoralis* and *hortensis*, at any rate, form two species; *hybrida* may be a form of the latter. The reasons for this view are as follows:—A practised eye may detect a difference in the size and shape, as well as in the colour of the two shells. A typical specimen of *H. hortensis* is smaller and more conical than a typical specimen of *H. nemoralis*. There is also a difference in the texture of the shell. *Hortensis* is the thinner and more transparent. In the second place, the two so-called varieties have never to my knowledge been observed to breed together,

and in the third place, although Mr. Jeffreys has made a statement to the contrary, they unquestionably often do live in company.

Now if two forms of a shell, or of any other organism grow together under precisely the same circumstances, they ought to have a good claim to specific distinction, for there is no external circumstance to explain the difference. If we find a large strong snail in a cabbage garden, and a small thin one, bearing considerable resemblance to it, in a barren and limeless district, there may be great reason to expect they are the same species, and that the differences between them are simply due to the different circumstances about them. A snail shell from Guernsey, whose granite rocks are deficient in lime, presents a curious contrast with a snail shell from a limestone district in England. But were two such snails found together in the same cabbage, there would be great reason to suspect specific difference.

It is quite true that the white and brown lipped snails very frequently live apart. To take local illustration, in Skelton Lane you will find only white lips, and I may say the same of Dringhouses, while on the Bishopthorpe Road I have only found brown lips. However, on the Malton Road you will find brown and white lips living together, and in many places about Scarbro', not excluding the Spa, you will find the same thing. From these reasons I am strongly inclined to believe that *Helix hortensis* is a distinct species from *H. nemoralis*.

H. hybrida, the pink lipped form, has the shape, size, and texture of *H. hortensis*, but I must admit I have found it in company with that species both at Scarbro' and York.

Many years ago I noticed a curious habit of these snails which I see has been lately described by Mr. Rimmer in his excellent book on our Land and Freshwater Shells. I was walking through a part of Danes Dike, near Flambro' Head, when the trees presented a most extraordinary appearance, being stuck all over with "happy couples" of pink and yellow snails. I have several times tried to witness this phenomenon again, but have never succeeded, nor can I devise the reason of it. Knowing as we do the partiality of thrushes for these

snails, it seems the very climax of suicidal folly for them to go up the trees at such a critical period of their existence.

The causes which determine the colouring of these variable snails are very obscure. Why should nearly all the specimens of *hortensis* up Skelton Lane be yellow, plain or banded, while at Dringhouses they are mostly pink? Why still more should the snails which lived in that little bit of hedge near the footpath from St. Mary's to the Scarbro' Railway Bridge be a remarkable dark liver colour, occurring nowhere else near York, and alas! no longer occurring there, owing to one of those improvements which naturalists lament everywhere? And to add insult to injury, they positively asked me to subscribe to the footpath which has destroyed the haunt of my precious snails. Why again should it please most of the pink Redcar shells to have only one band, while at Burlington that is the form of ornamentation selected by the yellow, and the pink, if they wear bands at all, adopt four or five? Sir John Lubbock is feeling his way to the laws of colour among flowers, but the laws of colour among animals are at present almost entirely unknown to us, and though self-protection may explain the stripes of the jungle-haunting tiger and certainly does explain the colouring of many insects, thousands of instances might be quoted, and among them our pink and yellow snails, where colour rather invites than precludes observation.

Variety of form and texture, however, may generally be accounted for with more or less satisfaction. *Helix nemoralis* and *hortensis* are widely distributed forms, occurring like all our other snails, over a considerable part of Europe. Therefore, as might be expected, they exhibit considerable variety of size and strength. The largest examples of these snails I have seen come from Vevey, on the Lake of Geneva. The warm climate and abundance of lime sufficiently explain their robust character. Specimens from San Sebastian, at the foot of the Pyrenees, are nearly as large. In England, the finest specimens come from the limestone districts of the South. The tiniest examples I have met with come from Knaresbro', near St. Robert's chapel. As the rock at this point is magnesian limestone the reason for their dwarfed character is obscure. They are white lipped,

and are not half the size of white lipped specimens gathered near the Forest of Fontainebleau in France.

There is one great reflection which above all others arises to the mind after considering a highly ornamented species like that before us. It is this: Can all the characters of living things be satisfactorily and sufficiently explained on the ground that they were developed by natural selection for the benefit of the species in question? Or is it not a fact that while natural selection has unquestionably been a great agent in the work of development, there are nevertheless to be found in many classes of living creatures, specially among shells and insects, decorations both of colour and sculpture, for whose existence as no natural cause can be conceived of, a supernatural cause is postulated?

DECEMBER 5TH.—Mr. W. KEEPING, M.A., read a paper on "The Geology of the new Railway Cuttings in the Cave District, South Yorkshire."

Mr. Keeping said that there are perhaps few areas in England which have been more carefully worked by Geologists than the cliffs of the Yorkshire Coast. Ever since the time of William Smith and Professor Phillips these cliffs have been frequently visited by scientific men, every foot of it has been carefully examined, and many valuable papers on their structure have been published. But much less attention has been given to the interior of the county, where of course good rock exposures are fewer, and far less complete than in the cliffs. So also the collections of fossils have been made mainly on the coast and not from the interior. This is very obvious in our own collections where, if we except the fine series of Malton and Whitwell fossils, only a very imperfect series of the inland Jurassic fauna exists. But these inland beds differ considerably from those described by Phillips at the coast, and it is left for us now to work out much of the detail of the variable groups of jurassic rocks in the interior of the county. Looking at the geological map we see that the mass of the oolites of Yorkshire form an imperfect concentric mass around the vale of Pickering, the rocks dipping down on the north-west and south in a basin

shape under that valley. The southern part of this basin or *synclinal* is found near the village of Acklam, and beyond this, from Bishop Wilton to the south of Market Weighton, the oolite rocks are lost to view, being hidden under the overlapping and unconformable rocks of the Cretaceous series.

But to the south of Market Weighton, through Cave and on to the Humber, the oolite rocks have been upheaved and again exposed to the surface, shewing an isolated area of jurassic rocks.

Particular interest attaches to this area as being situated in an intermediate place between the typical Yorkshire and Lincolnshire deposits, and it was therefore a most fortunate circumstance for geologists when, in the construction of the new Hull and Barnsley Railway, it was found necessary to carry the line through the Cave district, cutting through the hills and exposing the rocks in a series of sections only second in importance to those of the coast.

As we pass eastward from the low plain of York we meet with three successive ridges of land with intervening valleys before reaching the chalk wolds. These ridges are formed of the liassic, lower oolite, and middle oolite rocks, and their structure has been fully displayed by the railway excavations. Much of the detail has, however, again become hidden in the levelling and grassing of the slopes. The first, or Everthorpe cutting is mainly in the liassic series, also exhibiting a good section of chalk gravel.

The lias clay here seen is the ordinary blue clay, containing but few fossils; but a species of *Ammonites* (*Ægoceras capricornus*), which was not uncommon, served to determine the exact position of the bed, viz: the *Capricornus* zone of the middle lias. Other beds of the middle lias of an arenaceous character next succeed, there being first a soft red clayey sandstone (three feet thick), with *Avicula inequivalvis*, and then five feet of hard brown flaggy sandstone, more or less calcareous. A number of fossils occurred here, amongst which are *Waldheimia resupinata* and *Rhynchonella terahedra*, characteristic middle lias species, found especially in the *margaritatus* and *spinatus* zones. Thus we see that the first cutting consists entirely of

the *middle* lias formation, the lower division having been planed down by denuding agents to the level of the Vale of York, instead of standing out in hills, as it does further north at the village of North Cliff, etc.

The upper lias also is not seen anywhere in the cuttings, but it doubtless exists in the low ground to the east. Passing over this by the railway embankment (2,508 feet) we enter a second cutting, about twelve feet deep, where a set of pale-coloured oolitic limestones is exposed. It is a well-bedded rock, and the surfaces often shew numerous fragments of shells and branches of the little millipore, known as *Cricopora straminea*. A few other fossils have also occurred, namely—*Trigonia conjungens*, *Lima pectiniformis*, *Hybochypus*, etc. Altogether this rock and its fossils agree well with the Millepore rock of Yorkshire, especially as it is developed in the neighbourhood of Castle Howard Railway Station. Much of the stone is blue-hearted.

Our next exposure is the fine Drewton section, shewing a magnificent development of the Kelloway rock and part of the Oxford clay; also drift and gravel capping the hill.

The Kelloway series forms the greater part of this section, its total thickness amounting to thirty-five feet, and extending from one end of the cutting to the other, lying at an angle of five degrees. The series is conspicuously divided into two divisions—the rock bed above and the sands below; and the latter may be again divided into the (1) lower sands, pure and white, highly micaceous, and, notwithstanding its incoherence, well jointed, in which no fossils were found (five feet), and (2) the remaining twenty feet consisting of ordinary pale yellow sands, with iron-stained patches. Two small iron bands, somewhat more hardened, and crowded with casts of belemnites, occur in the lower part of this series, and in the upper portion, which is more deeply iron-stained, there is a double line of large boulder-like masses or concretions, of a hard and siliceous nature. Shells of *Myacites* and *Belemnites* occur in them. A number of these nodules are still seen standing out prominently on the sides of the cutting.

The next succeeding bed is the most conspicuous rock in the cutting, forming a bold rocky ridge along the whole section.

This is the rock bed of the Kelloway series—a moderately hard, jointed ferruginous sandstone of red or brownish yellow colour, eight feet ten inches thick. Fossils abound in it, especially the gryphea shell, *Gryphea bilobata*, large groups of which were readily obtained. Some fifty species were found, including many characteristic Kelloway shells.

LIST OF FOSSILS FROM THE KELLOWAY ROCK, OF DREWTON,
NEAR SOUTH CAVE.

<i>Rhynchonella socialis</i> , <i>Phil.</i>	<i>Perna rugosa</i> , <i>Goldf.</i>
<i>Waldheimia ornithocephala</i> , <i>Sby.</i>	<i>Pinna mitis</i> , <i>Phil.</i>
<i>Gressalya peregrina</i> , <i>Phil.</i>	<i>Pecten demissus</i> , <i>Phil.</i>
<i>Pholadomya ovulum</i> , <i>L. & M.</i>	<i>Pecten</i> , <i>sp.</i>
<i>Goniomya literata</i> , <i>Sby.</i>	<i>Avicula inæquivalvis</i> , <i>Sby.</i>
<i>Myacites decurtatus</i> , <i>Ph.</i>	<i>Placunopsis</i> .
<i>Myacites</i> .	<i>Avicula Braamburiensis</i> , <i>Phil.</i>
<i>Astarte lurida</i> , <i>Phil.</i>	<i>Gryphea bilobata</i> , <i>Sby.</i>
„ <i>sp.</i>	<i>Turbo</i> , <i>sp.</i>
<i>Isocardia</i> .	<i>Alaria bispinosa</i> , <i>Phil.</i>
<i>Corbicella ovalis</i> , <i>Phil.</i>	<i>Cerithium Culleni</i> , <i>Leck.</i>
<i>Cyprina</i> .	<i>Turbo sulcostomus</i> , <i>Phil.</i>
<i>Cardium</i> .	<i>Ammonites calloviensis</i> , <i>Sby.</i>
<i>Cardium Crawfordii</i> , <i>Leck.</i>	<i>Am. Jason</i> , <i>Rein.</i>
<i>Unicardium depressum</i> , <i>Ph.</i>	<i>Am. Mariæ</i> , <i>d'Orb.</i>
<i>Cucullæa corallina</i> , <i>Damon.</i>	<i>Am. modiolaris</i> , <i>Shuid.</i>
<i>Cucullæa</i> , <i>sp.</i>	<i>Am. Gowerianus</i> , <i>Sby.</i>
<i>Arca</i> , <i>sp.</i>	<i>Am. Koenigi</i> , <i>Sby.</i>
<i>Modiola pulchra</i> , <i>Phil.</i>	<i>Am. sublævis</i> , <i>Sby.</i>
<i>Trigonia Rupellensis</i> , <i>d'Orb.</i>	<i>Belemnites Oweni</i> , <i>Pratt.</i>
<i>Perna quadrata</i> , <i>Phil (non Sby.)</i>	

The dark blue homogeneous clay above this rock is the Oxford clay in its proper position, containing the common fossils *Belemnites Owenii*, *B. abbreviatus*, *Gryphea dilatata*, and *Plesiosaurus*. The rest of this cutting consists of the drifts and gravels, namely—a stiff blue boulder clay, fine yellow sands, and a coarse chalk gravel.

Much of the Oxford clay is, no doubt, hidden in the next valley, together with some Kimmeridge clay; but there is no sign of the presence of the Corallian rocks.

We now reach the chalk wolds, where an interesting series of beds has been exposed in cuttings and tunnels. Some confusion has been produced here by the slipping of the chalk over the Kimmeridge and Red chalk clays, which affects the level and apparent thickness of the latter rock. The Kim-

meridge clay is seen in several places : it is uniformly a black shaley clay, in which flattened *Ammonites* were found, but the species could not be determined. There can be little doubt as to its age.

The Red chalk is also well exposed, and one section (now hidden) gave a thickness of six feet eight inches. The true thickness may exceed this. The rock, especially in the upper four feet, is of a hard, rubbly or nodular character, a red clay occurring at the base. The fossils found were the common *Belemnites minimus* and *Terebratula semiglobosa*.

There is little that calls for special notice in the grey chalk and lower chalk. Seams of fullers earth are found in them, separating the beds, and the joint surfaces of the chalk are frequently coated with a black deposit of manganese.

There are two special beds now to be noticed in the white chalk. A zone of pink chalk, some thirty feet from the top of the red chalk, in thickness about 1 foot; and at twenty-five feet higher, there is a remarkable bed of an argillaceous and carbonaceous character, the central part being black and coaly, and yielding fragments of plants. The upper and lower divisions of this zone are laminated and jointed marls of pale yellow, greenish and brown colour, much of it being fullers earth. It is devoid of fossils. The total thickness of this series is about three feet.

Having now finished the description of the sections, there remains the question of the relations of these rocks to the neighbouring type in North Yorkshire and Lincolnshire.

Of late many geologists seem disposed to refer the South Yorkshire jurassic to the Lincolnshire type. This is supported by the absence of the great Yorkshire sandstones; but, on the other hand, the best marked rocks—the Millepore and Kelloway groups—agree well with the Yorkshire types, both in rocks and fossils. Nor do I see the necessity of referring them exactly to either type. They occupy an intermediate position, and may well be intermediate in character, for there is no doubt they were all formed as one continuous deposit.

In the sections here exposed I have not found a greater affinity to the Lincolnshire than to the Yorkshire type of jurassic rocks.

